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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Other communications relating to advertisements or general matters should be addressed to the Manager.

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Mr. Gray's Illness

EVERYONE will receive with deep regret the news that Mr. John Gray, the president of the Society of Chemical Industry, is seriously ill, and that he has been ordered to cancel all his engagements for at least two months. One unhappy result of this is that Mr. Gray will be unable to preside over the annual meeting of the Society this month at Newcastle. In the circumstances it is fortunate that Professor Henry Louis, his immediate predecessor in the chair, is able to take his place as acting president during the meeting. Professor Louis, on account both of his Newcastle connections and of his past valuable work for the Society, meets the needs of such a special situation singularly well. Mr. Gray, as we may imagine, is deeply disappointed at his inability to complete his year of office in the usual way. The members will all share his regret, and cordially wish him a speedy recovery. Mr. Gray's breakdown is one of the penalties which busy public men must nowadays risk. Though comparatively little has been heard in public of his presidential activities, he has worked very hard in the interests of the Society, and this, with his heavy commercial responsibilities, has obviously for the moment overtaxed his strength. Particularly he has applied himself to questions of internal organisation, and it is no secret that his energy has had a quickening effect throughout the Society He will be missed at Newcastle, but we shall all hope to welcome him back in full vigour at no very distant date.

Dr. Messel's Bequests

THE services which the late Dr. Rudolph Messel gave to the cause of chemical science and industry in his life time are to be continued after his death in the handsome bequests made under his will. Until recently managing director of Spencer, Chapman & Messel, chemical manufacturers, he held a prominent position in chemical industry, and he leaves the considerable estate of over £174,000. The bulk of this goes to the support of science. He gives £5,000 to the Royal Institution of Great Britain, £1,000 to the Chemical Society, and £2,000, his platinum still ("in which," as the document states, "I carried out, with W. S. Squire, my experiments in connection with the decomposition of sulphuric acid, requesting him on his death to leave it to the Society of Chemical Industry"), and his platinum crucible to the Society of Chemical Industry, and his electric telephone by Reis to the Institute of Electrical Engineers. After these and other bequests have been provided for, the residue of the estate is to be divided into five parts, four to go to the Royal Society and one to the Society of Chemical Industry. Dr. Messel expresses a wish that the fund shall be kept separate from the funds of the Society, the capital to remain intact, the whole of the income to be expended in the furtherance of scientific research and other scientific objects, and no part to be applied to charitable objects, such as the granting of pensions and the like.

There is a personal clause in the will which is pleasant reading: "I am a German by birth," he says, "but have been for many years naturalised in this country, the country of my adoption. I have devoted my life to scientific pursuits, and such fortune as I may leave has been acquired by me in this country, and consequently (my immediate relatives being already provided for) I am enabled to devote the bulk of my fortune to other uses." The position of many Germans in this country who are loyal to the land of their adoption, while retaining a natural feeling for the land of their birth, has been rendered difficult by the action of so many others, who have rewarded our hospitality with

ingratitude and enmity. Dr. Messel's will is a pleasant reminder that they are not all of the latter type, and it helps to make the relations in such cases easier on both sides.

A New Type of Thermo-Couple

A PAPER describing a new method of constructing thermo-couples, which was submitted to the last meeting of the Physical Society by Mr. Hamilton Wilson and Miss T. D. Epps, is of considerable interest to chemists. Although thermo-electric appliances have been used in one form or another for nearly a century, the method of constructing these has remained practically unaltered up to the present time—namely, by joining together with solder two metals suitably related to one another in the thermo-electric series. The method has several drawbacks, mainly owing to the fact that joints between dissimilar metals deteriorate at high working temperatures, while the labour expended is excessive when a large number of such joints have to be made for operation in series. The investigators attempted, therefore, to arrive at a convenient means of overcoming the usual practical difficulties, and they eventually contrived to make use of the facility with which certain metals can be deposited electrolytically upon other metals. For instance, if it is desired to form a thermo-couple of copper and iron, this may be done by taking a fine constantan wire which has a high specific resistance relatively to copper or iron, and coating one-half with copper and the remaining half with iron to any desired thickness, so that the coatings of copper and iron come in contact at the middle point of the constantan core. Then, if the thicknesses of the copper and the iron coatings are sufficient, this will act for all practical purposes in a similar manner to a couple formed by joining together a copper and a iron wire in the ordinary way.

With suitable precautions the core itself may be employed for one of the elements of the couple. The first attempt to carry out the latter principle was made by depositing a sheathing of copper upon a constantan wire, half way along its length, with the intention that a thermo-E.M.F. should be set up at the point where the copper sheathing ceased, when this point was raised in temperature above that of the ends. It was expected that the current would flow from the constantan wire to the copper sheath at the part heated, and that it would be practically uninfluenced by the presence of the constantan core. This was found to work successfully. Further tests were conducted with metals situated further apart in the thermo-electric series, but the results were disappointing owing to the smaller difference in the conductivity of the metals necessitating a much greater volume of metal in the sheath, and it was finally concluded that constantan wires with either copper or silver sheaths are most suitable. The method was found to be satisfactory not only with single junctions but also for the construction of thermopiles. For work where couples of exceedingly small mass are required the methods offer great possibilities, since the only limitation to the fineness of the junctions is that imposed by mechanical questions of producing the wire. In this way it has been found possible to construct junctions with a diameter of less than 0·0002 in., and there seems no reason why this limit should not be exceeded.

The Chilean Nitrate Position

THE half-yearly report of Mr. T. Aikman on the Chilean nitrate industry shows a decided recovery since the conclusion of the war. In some cases the figures are better than in 1913; in others they are approaching the pre-war standard. The deliveries in Europe and Egypt, which in 1913 were 1,804,000 tons, were for the twelve months ended this week 863,000 tons, not quite half; but deliveries in the United States have risen from 585,000 tons in 1913 to 818,000 tons in 1920, while those in other countries have advanced still further—from 87,000 tons to 233,000 tons. Production in Chile, however, has fallen from 2,691,000 tons in 1913 to 1,925,000 tons in 1920, while the present stocks in Chile have fallen from 16,000 tons in 1913 to 13,000 tons. The total supply in sight is 1,170,000 tons, as against 608,000 tons in 1913.

The world's consumption during the year just completed amounted to 1,913,000 tons. In America the demand so far exceeded expectations that it shows an increase of 50 per cent. over the last pre-war year. In the United Kingdom the demand was affected by the sharp rise in price and the relatively lower price at which sulphate of ammonia was available for home consumption. The large demand at home for sulphate of ammonia, however, weakened it as a competitor against nitrate in export markets, and the nitrate industry hopes further to benefit by the higher prices fixed for spring delivery In Germany, it is reported, the price realised for home produced atmospheric nitrogen products was about half that at which Chilean nitrate could be imported, but the supplies were inadequate to Germany's agricultural needs. An improvement in the coal position in Germany has resulted in some increase of production of synthetic nitrogen products, and the present output is estimated at about 60 per cent. of the amount of Chilean nitrate imported into Germany before the war. The new schemes for the production of synthetic ammonia in this country are not overlooked, but the opinion is expressed that "several years will elapse before the production of a nitrogenous fertiliser in any quantity will be attained." Some hope is obviously entertained also that the increased prices of sulphate of ammonia may benefit the trade in nitrate. It seems clear, however, that the present competition with Chilean nitrate must increase rather than diminish, and, as experts have recently suggested, may necessitate improved methods if the Chilean industry is to hold its own.

Short-Sighted Shareholders

WE are glad to see Lord Moulton's protest against the short-sighted action of a section of shareholders in Brunner, Mond & Co., in causing the withdrawal of the directors' excellent proposal to distribute £100,000 among universities and other selected institutions for the furtherance of scientific education and research.

The maintenance of our old and of our new industries will depend upon an adequate supply of scientists and technologists, and it is disappointing that the shareholders in a company whose wonderful development is explained so largely by its liberal applications of science should be out of sympathy with the directors' public-spirited action. Professor Donnan, in supporting the views of Lord Moulton, gives the following example from his own experience of the great practical value of such grants :—

Through the great liberality and generosity of the late Sir John Brunner and of Dr. Edmund K. Muspratt, a Professorship of Physical Chemistry and a well-equipped laboratory (costing about £17,000) were founded at the University of Liverpool. As Professor of Physical Chemistry and director of that laboratory, I had at my disposal, for the current expenses of teaching and research, a sum—provided by the University—of £200 per annum. The ordinary teaching expenses absorbed £150, leaving the sum of £50 per annum for the current research expenditure of a group of, say, 12 research workers. Such a state of affairs would be comical were it not so serious in its effects. At University College, London, the situation is precisely similar at the present moment. There is ludicrously little money available for current expenditure on research, and there would be none at all were it not for occasional small grants from the scientific societies and the Department of Scientific and Industrial Research ; whereas the amount required for current research expenditure in the chemical laboratories alone is about £2,000 per annum.

As Dr. Donnan neatly puts it, " the financial exchange is heavily against Germany, but I do not think the intellectual exchange is against them. The present situation in the United Kingdom is well known to the far-sighted and able directors of Brunner, Mond & Co., and it is very earnestly to be hoped that the shareholders of this great and deservedly famous company will support their directors in the splendid and pioneering action which they have desired to take."

The Swansea Oil Scheme

It is now more or less common knowledge that the Anglo-Persian Oil Company are expending several million pounds in converting, at Skewen near Swansea, a barren site into a hive of industry, shielded all round from the gaze of the curious by a high wall. The erection of buildings and plant has been going on for some time, and the progress made has reached such a stage that it is hoped to begin operations in about three to four months' time. The new works are mainly to be utilised for the rectification and storage of oil, the crude product being brought from the Persian Gulf to the port of Swansea, which will be connected with Skewen by a pipe-line. After purification, the oil will be returned to Swansea for re-shipment, and it is expected that four tankers will serve the port weekly. The lay-out of the plant and pipe-lines will be the most up-to-date of its kind, and in order to cheapen the process as far as possible it is said that the methods employed will largely eliminate the human element, the oil being scarcely touched by hand from beginning to end. At present the Anglo-Persian Company refine their oil at the source, and it is, perhaps, a little difficult to understand why they should be transferring the operation to this country. Probably, however, it is partly due to the fact that their products are mainly marketed over here, and the Government, of course, has a large interest in the concern.

While speaking of oil, it is interesting to note the state of affairs in America. The wholesale conversion of ships to oil fuel has resulted in the most acute shortage, the effect of which is being felt in this country. It is said, in fact, that out of 141 oil marketing concerns in America, no fewer than 125 are unable to get any oil at all. The secret of the trouble may no doubt be traced to the fact that, although the oil is reaching the seaboard, it has to remain there owing to the chaotic condition of transport on the railways, which are quite unable to deal with it. The mere fact of the oil lying stagnant at the ports has enabled the British companies to snatch a few freights which, had railway matters been otherwise, they would never have got.

The Taxpayers' Burden

The return which the Chancellor of the Exchequer has made of the amount of taxation per head in this country, compared with the other chief belligerents in the war, shows that to-day the British taxpayer carries the heaviest burden of all. The estimated figure for the current year is £22 os. 6d. per head, as compared with £10 3s. in the United States, £17 16s. 10d. in France and £21 15s. 8d. in Germany. These figures represent the amount at par, but converted into sterling at the current rate the position is much worse for us. On this basis, as compared with our £22 os. 6d. per head of population, the total taxation in the United States is £12 7s., in France £9 11s. 6d., and in Germany £3 1s. Up to a certain point, the British taxpayer submits loyally to the pressure, but pressed beyond a reasonable limit taxation may kill the incentive to commercial enterprise and individual industry. There is serious danger that already it is nearing this point, and that further pressure may have a disastrous effect on trade. The Government will be wise not to overdo the demands on the nation, and the same advice applies equally to labour. Both must ultimately share in any damage inflicted on the trade and production-capacity of the country.

The Calendar

July 5	Royal Institution of Great Britain : General Meeting of Members. 5 p.m.	Albemarle Street, Piccadilly, London.
6	London University : " The Biochemistry of Sterols," by Mr. J. A. Gardner. 5 p.m.	Physiological Laboratory, London University, South Kensington, London.
13–16	Annual Meeting of the Society of Chemical Industry	Armstrong College, Newcastle-on-Tyne.
13–14	Chemical Engineering Group, Fourth Conference : " Filtration."	Armstrong College, Newcastle-on-Tyne.
13–24	Exhibition of Chemical Products	Armstrong College Buildings, Newcastle-on-Tyne.
21	Dinner to Lord Moulton.....	Savoy Hotel.
Aug. 24–28	British Association	Cardiff.

The Cold Vulcanisation of Rubber

An Account of the New Peachey Process

Particulars are given below of the new process for the cold vulcanisation of rubber discovered by Mr. S. J. Peachey, of the Manchester College of Technology. The process is described by a chemist intimately familiar with the process, and opinions are added by H. P. Stevens, M.A., F.I.C., and Frederick Kaye, A.R.C.Sc.

The Old Processes

The discovery by Goodyear in 1839 of the process of vulcanisation forms by far the most prominent landmark in the history of the rubber industry. Prior to this date raw rubber had been employed to a limited extent in the manufacture of waterproof garments, but the drawbacks to its use were many and the finished articles never attained any high degree of popularity, mainly on account of the fact that they became "tacky" when exposed to summer temperatures, and for this reason could not be folded, whilst in the winter they tended to become stiff and uncomfortable. Raw rubber is, in fact, quite unsuited to the manufacture of rubber goods. Indeed, but for the invention of the vulcanising process it is possible that the industry which was created by Macintosh in 1825 might not only have failed to develop but possibly long ago have ceased to exist.

Goodyear's process consisted in incorporating with the washed and dried raw rubber a certain proportion of sulphur, and subsequently heating the mass to a temperature of 135°C.-145°C. for a period of time which varied with the amount of sulphur employed, roughly from one to three hours. Under this treatment the raw rubber acquires new properties which render it vastly superior from the point of view of the manufacturer. These may be summarised as follows :—

1. The strength, the durability and the elasticity of the rubber are considerably increased.
2. The sensitiveness to heat and cold is diminished.
3. It loses its adhesiveness.
4. It becomes insoluble in the solvents which readily dissolve raw rubber, and consequently resistant to their action.
5. Rubber which has been softened and plasticised by mechanical working, completely recovers its elastic nature on vulcanisation, a property which enables the manufacturer to soften the raw material by mastication in order to work in the sulphur and any desired filling or loading agents, to mould the mixing while in the plastic condition and subsequently to produce the finished article—permanently shaped—by merely heating the mould and its contents to the vulcanising temperature for the requisite time.

This process discovered in 1839 is, with hardly any modification, in constant use to-day, and the great majority of rubber goods are manufactured by its aid.

A year or so after Goodyear's discovery, Hancock introduced a modification of the process in which the formed articles of rubber were immersed in a bath of molten sulphur and kept therein at a temperature of 135°C.-145°C. until the raw rubber had become modified in properties to the desired extent. This process has never come into general application and is used in the manufacture of a few specialities only.

In 1846, Parkes introduced what is known as the "cold cure" process, whereby a superficial vulcanisation may be effected by immersing the rubber in a weak solution of chloride of sulphur in carbon bisulphide. Under these conditions, not only sulphur, but an equivalent amount of chlorine also passes into the rubber, and the product is hardly comparable with that produced by the original Goodyear process. The application of Parkes' process is limited in practice to the manufacture of proofed fabrics and of a few dipped goods.

From the time of Parkes' discovery of the sulphur chloride method of vulcanisation in 1846—three quarters of a century ago—nothing in the nature of a chemically new process of vulcanisation was invented until July 1918, when the process which forms the subject matter of the following notes was discovered and a patent applied for. In no other industry, probably, is it possible to point to a lapse of 79 years between the discovery of the processes which established the industry and that of a fundamentally new process, which, to a great extent at least, should replace the time-honoured methods of bygone days.

Disadvantages of the Old Processes

The chief disadvantages of the Goodyear hot process are :—

1. The continuous use of a steam, both as a heating agent and as a medium for exerting pressure on the goods under treatment.
2. The restriction of the manufacturer to the use of some half-a-dozen pigments—antimony sulphide, zinc oxide, chrome green, &c., which renders it impossible to obtain any range or variety of shades. Coal tar colours and lakes with hardly any exception are destroyed or modified by the combined actions of sulphur and heat.
3. The impossibility of introducing, with satisfactory results, organic filling materials of the nature of leather waste (especially vegetable tanned), wood meal and numerous other cheap waste products, the use of which would enable the manufacturer to turn out certain classes of vulcanised goods, possessing great durability, at a very cheap rate.
4. The labour involved in dealing with heavy moulds, vulcanising pans, &c.
5. The time required for completing the process.

The second and third of the above-mentioned disadvantages apply equally to the Parkes' "cold cure" process; and added to these, sulphur chloride is a destructive agent towards most materials, and rubber vulcanised by its aid is very inferior to that vulcanised with sulphur alone.

The New Process

The new process for the vulcanisation of rubber (British Patent No. 129,826) is based upon an entirely new principle and consists in exposing the raw rubber alone, or in admixture, with practically any useful filling agent or pigment alternately to the action of each of two gases—sulphur dioxide and hydrogen sulphide. The gases diffuse into and interact in the rubber producing a particularly active form of sulphur which is capable of combining with and vulcanising the rubber without the aid of heat.

The process differs from the Parkes' process in that it yields a true vulcanisation involving the combination of sulphur alone with the rubber, whereas the Parkes' process yields an additional product of the rubber with *sulphur and chlorine*, and this product does not possess the true characteristics of rubber vulcanised by sulphur alone, as, for example, in Goodyear's process.

The new process is applicable not only to rubber in its ordinary forms (as an elastic or plastic solid), but also to dissolved rubber. The treatment of a rubber solution alternately with the two gases specified brings about complete pectisation of the solution to a jelly consisting of vulcanised rubber distributed through the solvent. On expelling the latter by evaporation, a fully vulcanised rubber of excellent quality is obtained. This forms a striking demonstration of the new process. Further, the process is completely under control and renders possible the production of a theoretically perfectly vulcanised

rubber containing no free sulphur and therefore not liable to undergo after-vulcanisation or "ageing." The importance of this in connection with the question of the durability of rubber goods, cannot be over-estimated. No heat is used in applying the new process, and this renders it possible to introduce into the rubber all types of coal-tar dyestuffs or lakes (and even natural colouring matters such as chlorophyll) with the production of delicate shades of colour quite unobtainable under the old conditions.

Further, organic materials, *e.g.*, leather waste, wood meal, starch cellulose, &c., which are decomposed or partly decomposed at the temperature of vulcanisation used in Goodyear's process (or by the action of sulphur chloride in Parkes' process) can by the new process be introduced into rubber mixings, yielding cheap, fully vulcanised products with new properties and exceptional durability. In this manner, for example, a new class of material to replace linoleum and other floor coverings can be produced, largely from waste substances, with distinctly superior qualities as regards colour, durability, and flexibility. The time required for the complete series of operations involved is about an hour, whereas the time required for producing machine-made floor-cloth by the present-day process of manufacture is about one month. Apart, therefore, from the difference in the price of raw materials, the saving in time represents an enormous reduction in the cost of manufacture.

Similarly by the use of leather waste (buffings and shavings) in conjunction with the new process it becomes possible to turn out, not a mere leather substitute, but a substance which actually is leather—reformed from the waste. As might be expected, such a material is superior in every way to a substitute, and, in fact, possesses all the valuable properties of the original leather together with the added advantage of being waterproof. The process lends itself to the manufacture not only of hard wearing leathers suitable for boot and shoe manufacture, but also of delicately coloured and grained leathers for upholstery and fancy work.

Further, by the application of the new solution process it becomes possible to build up the reformed leather into any desired article, to join all seams by vulcanisation and to attach soles and heels by the same method. Thus all stitching and rivetting may be dispensed with. An important feature in this connection is that the whole of the waste cuttings can be worked up again into the form of sheet and utilised for the manufacture of new goods.

The new process, in addition to being a cold process, and thus eliminating the cost of steam, employs two gases which are by-products of several chemical manufacturing processes (almost waste products) and which are available in quantity at a very low cost. In time also, the process effects a considerable saving, being completed—for an average mixing—in about one quarter of that required by the hot process.

Advantages of the New Process

The outstanding advantages claimed for the new process may be briefly summarised as follows:—

1. The vulcanisation is effected in the cold. The cost of steam being thereby eliminated.

2. The process occupies about one quarter of the time needed by the present-day (Goodyear) process.

3. The agents employed for the vulcanisation—sulphur dioxide and hydrogen sulphide—are available in almost unlimited quantities and at a very low cost.

4. Almost any colouring matter, natural or artificial, can be employed in conjunction with the new process, with the result that a much larger range and variety of coloured effects is obtainable than is the case in the present practice.

5. Organic filling agents which are destroyed or partly destroyed by the Goodyear or Parkes processes can be safely introduced into mixings which are to be vulcanised by the new process.

6. Rapid cold-curing solutions can be prepared in a few moments, and as required, for use in tyre repair, jointing, boot and shoe repairing, and for building up goods of all classes.

7. Dipped goods can be rapidly and effectively cured by the new process.

Opinions on the New Process

I.—By Henry P. Stevens, M.A., Ph.D., F.I.C.

I am confident that the method of vulcanising discovered by Mr. Peachey is entirely novel, and I see no reason why it should not be employed on a large scale in the manufacture of rubber goods and for the production of new technical effects. This is rendered possible in that—

1. The vulcanisation takes place at ordinary temperatures; that is to say, it is a cold vulcanisation.

2. The re-agents employed, namely, sulphur dioxide and hydrogen sulphide gases, have little or no action on fibrous organic substances which can therefore be used as fillers.

3. The reaction between sulphur dioxide and hydrogen sulphide, with resulting vulcanisation of the rubber, will take place in the presence of moisture whereas moisture causes porosity (a serious defect in heat vulcanised goods), and decomposes sulphur chloride. The ordinary processes can therefore only be used when all the ingredients are thoroughly dried. The manufacturers under the Peachey process can, on the other hand, employ a number of substances as fillers which cannot be used satisfactorily under the ordinary processes.

Two of these substances have been utilised experimentally with considerable success, namely (*a*) wood meal or fine sawdust, and (*b*) leather buffings. Both these substances suffer some decomposition if vulcanised with sulphur in the heat at an ordinary vulcanising temperature of, say, 140°C. to 150°C. Both hold moisture, tend to produce porosity, and decompose sulphur chloride. Consequently they are unsuitable for vulcanising by the ordinary processes.

(*a*) Large quantities of wood meal or fine sawdust can be incorporated with raw rubber, particularly with the aid of well-known plasticising ingredients such as oils, bitumens, and very low grade resinous rubbers, such as pontianac. In this way vulcanised products can be obtained with proportions of rubber as low as 12 to 20 per cent., and containing as much as two-thirds by weight of wood meal. These mixtures would seem to be very suitable for use as linoleums or similar floor coverings. The low price of rubber, together with the rapidity and simplicity of manufacture, should enable these products to compete with the oxidised oil products, particularly as experiments have shown that the greater flexibility of the rubber product renders a canvas backing unnecessary.

(*b*) I have been shown excellent samples of artificial leather prepared by compounding the buffings with 18 to 37 per cent. of raw rubber and vulcanising by the Peachey process. Previous to vulcanising, the compound is readily embossed with a suitable pattern. Under a buffing test, the material appeared to be as tough and resistant as samples of leather similarly treated, and I have inspected a boot soled with this artificial leather which had been worn and showed less wear than an ordinary leather sole.

The Peachey process is not confined to the vulcanisation of solid rubber articles, but is also applicable to vulcanisation in solution. The raw rubber is dissolved in a suitable solvent such as benzene, and treated with a measured amount of gas; a sufficiency of the second gas is dissolved in a further quantity of the solvent and the two liquids are mixed. The mixed solution gradually thickens, that is, becomes more viscous, and in the course of a few minutes sets to a gel of vulcanised rubber. If the solvent be allowed to evaporate, the gel shrinks to a piece of ordinary vulcanised rubber.

With regard to the practical side of the process, I see no reason to anticipate any difficulties beyond those invariably experienced in the translation of the process from the laboratory to the manufacturing scale. Both gases are easily and cheaply made. Sulphur dioxide is made continuously in works all

over the country for the manufacture of sulphuric acid, sulphite, bisulphite, &c. Hydrogen sulphide is made on a large scale for certain processes and is a by-product in chemical industries.

II.—By Frederick Kaye, A.R.C.Sc.

In my opinion Mr. Peachey's discovery is the most important advance in the technique of rubber manufacture since the discovery of the sulphur chloride cold cure process of vulcanisation by Parkes in 1846.

Although much work has been done by several chemists—Joule and Ditmar, and more recently James Dewar and Shakespear—as to the absorption of gases by rubber and the rate of passage of various gases through rubber membranes, no one has heretofore realised the immense value of the apparently simple process of allowing the interaction of successively absorbed sulphur-containing gases in the closest interpenetration of the molecular structure of the rubber to produce the chemical and physical condition of rubber known as vulcanisation.

Never, to my knowledge, has vulcanisation by the action of nascent sulphur been demonstrated before. The discovery of this reaction covers an entirely new field. One great advantage it has, as a practical process, is that the vulcanisation takes place at ordinary temperature and therefore the expensive conditions for high temperature vulcanisation are not required.

This temperature factor is of immense importance because, as a result of the ordinary temperature of the process, a range of materials can be used in the rubber compounds which it would be impossible to use in heat vulcanisation processes. Therefore, new classes of products which have very great possibilities of use become immediately available, to manufacture which considerable developments of new branches of the rubber industry will be required.

At present it is proposed to manufacture chiefly two classes of goods. (1) Vulcanised rubber leather compounds; (2) Vulcanised compounds to take the place of linoleum and such like materials. I have thoroughly examined all details in the manufacture of these goods by the Peachey processes and can confidently assert we have here at once available an achieved invention capable of quickly attaining great industrial activity and success.

I am convinced that the processes have been so far perfected in the laboratory that manufacture on a large scale is now only a matter of the dimensions of the plant put down and the skill and amount of labour available. The Peachey processes will ultimately use very considerable quantities of plantation rubber, but for some qualities of goods a mixture with so-called lower grade resinous rubbers gives the effect and properties desired. Fortunately, in the tropical and sub-tropical regions of the Empire and other countries, are many varieties of plants from which these rubber containing products may be obtained.

In 1909, 1910 and 1911, I was engaged in the study of cultivated rubbers, and many varieties of indigenous rubber-yielding plants in Uganda, British East Africa, Mexico and the sub-tropical regions of South Africa. From my experience and investigations in those countries, I can say that these grades of wild rubbers can be obtained in immense quantities to keep pace with growing manufacturing requirements.

Acid in Tonic

In the King's Bench Division on June 25, the Lord Chief Justice heard an action brought by Isaac Fairman, of 29, Sonning Buildings, Bethnal Green, against William Fox & Sons, Ltd., chemists, of 169, Bethnal Green Road, N.E., claiming damages for injuries he received through the alleged negligence of defendants or their servants. The plaintiff alleged that purchasing a quinine and iron tonic from defendants he was sold a mixture which contained 8½ per cent. of hydrochloric acid. The defendants denied negligence, and said they sold no such mixture as alleged. In giving judgment his Lordship said that the firm had been established for 110 years, and had a high reputation and nothing that had been said in the case should be allowed to reflect on them. He could see various ways in which a mistake could have occurred in a time of great pressure. The only question was one of damages. Judgment would be entered for the plaintiff for £20 and costs.

Chemistry for Public Health Students

To the Editor of The Chemical Age

Sir,—In your issue of the 19th inst. there appeared a review of my book, "Chemistry for Public Health Students," and as the reviewer is, I think, unduly severe in his criticisms and very sparing of his praise, I trust you will be good enough to allow me space to reply to his remarks.

In the first place I think my critic is under a misapprehension as to the ground intended to be covered by the book, and has lost sight of the fact that it is meant primarily for candidates for the Diploma in Public Health. As explained in the preface, my aim has been to produce a small book containing the chemical work required for the diploma; I have therefore excluded everything I considered unnecessary, but have given many references to enable the reader to obtain fuller information should he wish to do so. Under the circumstances it seems rather unreasonable to find fault with me for omitting to explain the "analytical difficulties" underlying the Cocoa Powder Order and for neglecting to deal with the analysis of sausages and of potted meats, all of which, though of importance to the public analyst, are outside the scope of a work of this nature and size.

Now to deal with some other points seriatim:—

1. If the reviewer will refer to the bottom of page 82 he will see that the approximate composition of "white bread" is there stated.

2. I do not agree that the statements in regard to formaldehyde as a milk preservative are contradictory; it is perfectly correct that formaldehyde is one of the preservatives most commonly added to milk (when preservatives *are* added, which, fortunately, is not very often), although such addition has been condemned, as stated on page 94, and is illegal, as stated on page 95.

3. Sewage Effluents.—The Royal Commission on Sewage Disposal recommended those standards and tests which I have dealt with at some length in the book. The "dissolved nitrogen content" was considered by them to be of less value from the point of view of a general standard.

4. Atmospheric pollution.—The extract from the report on this subject has been included as being a matter which is of interest and which will, one hopes, come into greater prominence in the future. It is still, however, more or less in the experimental stage, and to take up space with a description of the apparatus employed, though interesting, would hardly be justifiable in a small book of this kind.

5. Disinfectants.—I must take exception to all the reviewer's criticisms on this chapter. So far as I know, there is no evidence that formaldehyde owes its bactericidal power to its reducing action; on the other hand its effect upon albumen is well known. In support of my view I should like to quote Rosenau's "Preventive Medicine and Hygiene": "It is from this property of combining directly with the albumins forming the protoplasm of the micro-organisms that formaldehyde is supposed to derive its power as a germicide."

The statement that I have given "a variety of unnamed proprietary disinfectants" is incorrect, as several of these articles are named and described on the same page (p. 204).

Finally, "bacterial tests" would be out of place in a chemistry book; they are given in works on bacteriology, to which they belong. Apologising for the length of this letter,

I am, &c.,

City Analyst's Department, Liverpool. E. Gabriel Jones

June 30, 1920.

Finsbury Technical College

Professorship of Applied Chemistry

To the Editor of The Chemical Age.

Sir,—The Finsbury Technical College (known to all associated with it as "Finsbury"), under the management and supervision of the City and Guilds of London Institute, may be to many a college almost unknown, yet it has been responsible for the training of more scientists than space would here permit me to enumerate.

The writing of this letter has been occasioned by a circumstance of vital importance which has occurred to a certain section of the students at the above-named college, and by an article which has appeared in to-day's issue of the "Tele-

graph" which, although it states nothing definitely, seems to portend nothing but evil for the college.

The object of writing is, therefore, to arouse public interest and obtain public opinion and help where possible on the state of affairs in the department of applied chemistry, and with this end in view I am writing on behalf of my fellow students.

For the past three years we have had the good fortune of enjoying the privilege of a professor whose undoubted fame and ability have not only now secured to him the Chair of Chemistry at a famous British University, but have given to Finsbury even more dignity and prestige than former professors in the faculty of Applied Chemistry did, and which, in common with many, the writer has been able to share, as students can when their professors' first thoughts are in the interests of the college.

No college can rest on its laurels for ever, and though we of the Applied Chemistry Department of Finsbury may exist, even live for a time, but without the guiding light, both educationally and influentially, of a professor, the time must come when our name will stand for nought. So we find ourselves at the end of the 1919-1920 session as we were at the commencement, still without a professor, and up to this time the students have heard nothing as to the appointment, nor had any official intimation of any steps which have been made to secure a new one. We can only presume that the cause of this long vacancy in the Chair of Applied Chemistry is one of finance, it is impossible to imagine that those in authority are not doing their utmost to relieve a position which is fast becoming a crisis.

I appeal, therefore, to the public interested in applied chemistry, and there are many, and to those who, being in the scientific world, more especially the old students of the college, of necessity know of Finsbury and its fine history, to ask themselves the question whether it is a fair treatment of British chemistry students at such a time when England has, by her chemical ability and ingenuity, freed herself from "national disaster and personal enslavement," and whether to all those who have materially benefited by chemical research during the war their duty is not obvious? I appeal not only for our department, but for the college as a whole, for when one hears whispers that Finsbury is going down, that interest among those in whom its management is vested is slack, does it not touch one very deeply when in many cases they know that their chemical knowledge and future, realised or prospective, has been given to them by that college?

I will conclude by asking whether the writing of this letter and the plea I have put forward will be sufficiently justified when I say that associated with the college are the names of such men as Professors S. P. Thompson, Meldolo, Perry, Ayrton, and H. E. Armstrong?

Will it appeal to the thinking public when they learn that the present professors in the faculty of chemistry at the Universities of Cambridge, Birmingham, and Sydney were trained at Finsbury? Shall I be over-rating the high standard of a Finsbury training when I say that some of the finest engineers and chemists, of world-wide fame, have been trained at the College? No, of the latter statement I can rest assured that the scientific world must agree with me, for hard facts are infallible.

I ask then is it conceivable that a college, the parent of Technology in the City of London, will at the present time be allowed to sink into obscurity and its name to be no longer the pass-word of efficiency? And again, is it not still less conceivable that the City and Guilds of London are unable to finance and carry on in a progressive manner a College which for 36 years has held the foremost place in technical science!—I am, &c.,

A STUDENT OF THE DEPARTMENT OF APPLIED CHEMISTRY.
Finsbury Technical College, June 29.

Physical Apparatus for Canadian University

To the Editor of THE CHEMICAL AGE

SIR,—I beg to state, for the information of your readers, that a report has been received in this Department from His Majesty's Trade Commissioner at Toronto (Mr. F. W. Field) to the effect that a professor of a Canadian university desires to receive catalogues from United Kingdom manufacturers of physical apparatus for university laboratories for his guidance in placing orders.

The name and address of the professor referred to will be furnished by this Department to any United Kingdom manufacturers interested on application.—Yours, &c.,

Department of Overseas Trade,
35, Old Queen Street,
S.W.1, June 28.

L. N. BARKER,
For Comptroller-General.

Scottish Oils, Ltd.

Value of Sulphate of Ammonia

THE first annual meeting of Scottish Oils, Ltd., was held in Glasgow on Thursday, June 24, Sir Charles Greenway, chairman of the company, presiding.

In reviewing the work of the past year the chairman said the present satisfactory position of the company was largely due to the unification of management and the consequent better working and reduction of expenses all round, and he was of opinion that the amalgamation of the companies would be a great aid to, if not the salvation of, the Scottish shale industry. "Sulphate of ammonia," he said, "is a very important product with us, and during last year it was in very active demand, and the price obtained for the home trade was that arranged with the Board of Agriculture, licenses being granted to the Sulphate of Ammonia Equalisation Committee for the export of any surplus. This committee was set up to pool the export business amongst makers, thus encouraging sales in the home market. This plan worked well, and there was a feeling that some permanent arrangement on these lines was desirable. This desire is being given effect to by the formation of the Sulphate of Ammonia Federation, Ltd. This federation has just been formed, and at present embraces 444 makers out of a total in this country of 499, and this membership controls 90 per cent. of the total production in the United Kingdom. The production of the Scottish oil companies is about one-sixth of the total output of the United Kingdom, and in virtue of our large interest in this product our representatives have taken a leading part in the formation of the federation. We are also represented on the council of the executive committee. As a result of the war home farmers have come to appreciate the value of sulphate of ammonia as a fertiliser to a greater extent than ever before. In the year before the war only about 50,000 tons were used for agricultural purposes at home, while during the last year of the war the quantity used was about 270,000 tons. While it may not be possible to maintain this figure when other forms of nitrogen are again available, we believe that sulphate of ammonia has obtained for itself a permanent place in home agriculture. It is also anticipated that the formation of the federation will lead to substantial benefits in the conduct of the export trade. Hitherto there has been little cohesion amongst the makers so far as marketing was concerned, and the trade suffered from this in meeting the competition of foreign producers. It also created a very weak position, as there were something like 5,000 sellers and only about a dozen export dealers, which resulted in an extremely speculative and fluctuating market. The federation will now undertake the marketing of the whole production of its members. Competition between makers will cease, and speculative dealings be eliminated. The federation will keep in close touch with the world's markets; and makers will have the satisfaction of knowing that they are receiving the market value for their product.

"As already indicated, the Government has for some years been taking a close interest in the disposal of sulphate of ammonia, and, recognising its great value to the nation, especially in these days of shortage of food supplies, has decided to exercise control for a further period. Arrangements have been made with the Board of Agriculture whereby farmers here will obtain their supplies at agreed prices, makers being allowed to export any surplus. The prices fixed show a considerable advance over those ruling last year, this being necessary to meet the increased cost of manufacture. There is at present a world-wide shortage of nitrogen products of all kinds, so that we feel sure of a good market for our production of sulphate of ammonia."

The report and accounts were unanimously adopted, and a resolution was passed fixing the remuneration of the directors at £4,500 per annum.

The Chilean Nitrate Industry

Review of Trade Conditions for the past half-year

MR. THOMSON AIKMAN, JR., in his half-yearly report on the nitrate industry, dated June 30, states :—

The demand for fertilisers has made further progress during the past spring, but the serious financial condition of Europe resulting in a further heavy depreciation in the currencies of France, Belgium and the Central Powers at the height of the consuming season prevented many consumers from covering their requirements. That their crops have suffered in consequence, more especially in the case of sugar beet, is becoming evident, and should tend to a more extensive application next year.

Nitrate of Soda

The following is a comparison of the figures for the 12 months ending June 30, 1913, 1914, 1919 and 1920 :—

Twelve Months ending June 30.	1913.	1914.	1919.	1920.
	Tons.	Tons.	Tons.	Tons.
Deliveries in Europe and Egypt	1,8 4,000	1,984,000	—	862,000
Deliveries in United States	585,000	553,000	—	818,000
Deliveries in other countries	87,000	92,000	115,000	233,000
Shipments to Europe and Egypt	1,950,000	2,025,000	416,000	997,000
Shipments to United States	607,000	546,000	1,224,000	1,047,000
Shipments to other countries	91,000	87,000	128,000	215,000
Production in Chili	2,691,000	2,822,000	2,298,000	1,925,000
Visible supply for Europe and Egypt at June 30	420,000	416,000	178,000	359,000
Visible supply for United States at June 30	95,000	83,000	60,000*	272,000*
Visible supply for other countries at June 30	16,000	12,000	7,000	13,000
Stocks in Chili at June 30	608,000	754,000	1,490,000	1,170,000
Total supply in sight at June 30	1,139,000	1,265,000	1,735,000	1,814,000†

* Excluding a reserve stock of 300,000 tons in the hands of the American Government.

† Estimating production in June at 200,000 tons and shipments at 70,000 tons to Europe, 120,000 tons to the United States, and 10,000 tons to other countries.

The world's consumption during the 12 months thus amounts to 1,913,000 tons, as compared with an estimate of 2,000,000 tons made at this date last year. In America the demand has exceeded expectations, and shows an increase of nearly 50 per cent., as compared with the last completed pre-war year. Efforts are understood to have been made to induce the American Government to dispose of part of their reserve stock when the demand was most active, and had this been done, consumption might have increased accordingly. After protracted negotiations, however, this fell through, and it is understood that their intention now is to retain this stock permanently. The increase in consumption is reported to be largely for agriculture, and there is reason to hope for a further increase during the coming year. In other countries outside Europe the increase as compared with 1913/14 is over 150 per cent., and is largely accounted for by Japan, where nitrate has now established itself as a fertiliser, although the financial crisis ruling there appears likely to interfere with any further important development during the next 12 months.

The following are the detailed figures of deliveries for Europe and Egypt for the years ending June, 1913, 1914, 1919 and 1920 :—

	U.K.	France.	Belgium.	Holland.	Spain and Portugal.	Italy.	Scandinavia.	Egypt.	German & Baltic Ports.	Total.
1913	120,000	320,000	200,000	90,000	40,000	70,000	60,000	44,000	860,000	1,804,000
1914	123,000	350,000	205,000	100,000	50,000	65,000	76,000	55,000	960,000	1,984,000
1919	19,000	131,000	48,000	115,000	30,000	15,000	86,000	9,000	—	453,000
1920	67,000	218,000	99,000	125,000	114,000	44,000	67,000	75,000	53,000	862,000

In the United Kingdom the demand was interfered with by the sharp rise in price and in consequence the relatively lower price at which sulphate of ammonia was available for home consumption, but as a result the quantity of the latter consumed was so large that the supply available for export as a competitor to nitrate in other markets has been greatly reduced. The higher scale of prices fixed for the sale of sulphate of ammonia for next spring delivery should, however, be in favour of nitrate during the coming year, and already considerable purchases of nitrate have been made by consuming dealers for next spring delivery. In Holland, Spain, and Egypt the demand has been very satisfactory and shows a large increase on pre-war figures. In France and Belgium the deliveries are nearly double those of last year, but are still much inferior to the pre-war level, which was accounted for by the sudden raising of the price in francs by 30 to 40 per cent. at the height of the consuming season, necessitated by the sensational fall in the value of their currencies. The loss to consumption thereby is estimated at at least 100,000 tons. In Central Europe consumption has been interfered with by the ruinous value of the mark, and the small imports that have taken place have been made by the German Government. Notwithstanding an increase in their local production of atmospheric nitrogen products, Germany is reported to have been quite inadequately supplied with nitrogen, with the result that the beet sugar crop is likely to be curtailed, and if the recent improvement in exchange continues imports on a materially larger scale are probable for next season. The price realised for their home production of atmospheric nitrogen products was reported to be about half that at which Chilean nitrate could be imported, and as the value of the mark has since then about doubled, it would appear as if the cost of the respective articles for next season will be more favourable to Chilean nitrate. There appears little doubt that the latter is greatly preferred by consumers at anything approaching the same cost. Inquiries for considerable quantities were also received from Czecho Slovakia and Poland, but owing to difficulties in connection with finance, the actual purchases were unimportant.

Consumption Estimate for 1920-21

Considering the unfavourable factors operating in the consuming markets the European consumption, while falling short of estimates by about 100,000 tons (and for which supplies had been provided), cannot be regarded as unsatisfactory, and while it is impossible to form a reliable estimate, there is every reason to expect a considerable increase next spring, and a consumption for the world during the next 12 months of at least 2½ million tons should be reached.

The market during the six months has been active and the price paid for due cargoes has varied from 22s. to 26s. 6d. per cwt. c.i.f., as compared with 21s. 6d. to 23s. 6d. in the closing months of last year. The average works out at probably about 23s., and as costs of handling at the ports of discharge and transport to the interior have materially increased, it is probable that the average price paid by consumers was about 24s. 6d. to 25s. 6d. per cwt. A considerable business has already been done for next season's arrival at 23s. 6d. to 24s. 6d. per cwt. c.i.f., and the value at the close is about the latter figure.

At the beginning of the year the value of f.o.b. was about 12s. to 11s. 3d. for shipment over 1920, 10s. 6d. over 1921, and 10s. per quintal over 1922 ; and by the middle of February

prices had risen to 17s. 6d. for spot, 16s. 6d. July/December, 1920, 15s. over 1921, and 14s. 6d. per quintal over 1922, declining again in May to 15s. to 15s. 6d. for 1920, 13s. 9d. 1921, and 13s. 1d. per quintal for shipment over 1922. Since then there has been a steady improvement and closing values are about 15s. 6d. for spot, 16s. 7½d. July/December, 17s. 3d. December/March, 16s. January/December, 1921, and 14s. per quintal for January/December, 1922. The German companies are reported to have sold the principal portion of their production up to the end of this year at prices somewhat under those obtained by the Producers' Association, and they have also sold largely over 1921 and 1922, the buyers of the later positions being the Americans. The feature at the close has been the reported purchase in Chile of several lots of f.o.b. for next autumn shipment by German buyers.

Freights have shown a steady decline during the six months under review, and are now quoted about 100s. to 120s. per ton basis Bordeaux/Hamburg range, while liner tonnage direct to U.K. ports has accepted as low as 70s. per ton. This compares with an average rate of freight paid for last season shipment of probably 230s. per ton.

Exchange was 11 11/16d. at the beginning of the year, and has since fluctuated between 11d. and 16½d., closing at 12⅞d.

The Nitrate Producers' Association has now allotted quotas of production to its members, which in many cases exceed their actual production during recent years by 15/20 per cent. The total consequently arrived at amounts to the large figure of 73½ million quintals, and as the German and American companies outside the Association are at present producing at the rate of 8½ and 2 million quintals respectively (which, as they have every incentive to push production at the present high level of selling price, is probably about their maximum), the total nominal capacity of Chile amounts to 83½ million quintals, or 3,750,000 tons, of which 88 per cent. are in the Association. Friendly efforts have continually been made to induce the German producers to join (the Americans being debarred from doing so by the Sherman law), but have so far proved unsuccessful. It would not, therefore, be surprising if measures of a more coercive nature were now adopted, as it is scarcely reasonable for the benefits of the Association in the matter of high prices to be conferred on them without their having to suffer the disadvantages resulting from the regulation of production. The principal argument apparently used by them against joining—that the Association have raised the price to a level that is likely to interfere with consumption—is scarcely applicable to the present circumstances, when the price paid by the consumer in the principal consuming markets is liable to vary, and has varied during the past season as much as the equivalent of 10s. per quintal, owing to the fluctuations in the rates of exchange, and up to 6s. per quintal as a result of the fluctuations in ocean freights.

N.P.A. Sales

The sales made by the Producers' Association up to December 31, 1919, amounted to about 1,300,000 tons, at an average price of 9s. 2½d. per quintal, and rather more than covered the stocks in Chile held by the associated producers at that date. It then became evident that with falling freights buyers were coming forward more eagerly, and the new method of selling by tender was adopted. The first tender was called for 100,000 tons, May/June delivery, on January 9, at a minimum price of 12s. per quintal, and resulted in the sale being effected at 12s. 9½ per quintal. Further tenders were called for February 5 for 200,000 tons April/June delivery, at a minimum price of 13s. 9d., and 300,000 tons July/December delivery at minimum prices averaging 13s. 11d. per quintal. The total offers made amounted to about 1,400,000 tons, and the prices accepted averaged 14s. 8½d. for April/June and 15s. 4½d. per quintal for July/December delivery. Offers were then called for February 26 for 100,000 tons March/June, and 150,000 tons July/December delivery at a minimum price of 17s. per quintal, but owing to the abstention of the large dealers only about 50,000 tons were applied for, and sold at an average of 17s. 2d. per quintal. Further offers were called for March 24 for 100,000 tons, April/June, at 16s. 9d., and 400,000 tons July/December delivery at minimum prices of 16s. 9d. to 17s. 6d. per quintal, according to position; but nothing was applied for. Private negotiations were then initiated by several important dealers, and offers for upwards of 1,250,000 tons were made at 15s. 6d. to 16s. per quintal, but after protracted negotiations proved fruitless. Nothing further transpired, except for the sale of several small parcels totalling about 50,000 tons at about 17s. per quintal, until early June, when the Producers' Association decided to revert to the old method of selling, and fixed prices for 1,100,000 tons for delivery between June, 1920, and April, 1921, at 15s. 6d. to 17s. per quintal, according to position, with the addition of a "fall clause" protecting buyers against any possibility of a further reduction in price by the Association. An active demand then set in, and about 860,000 tons were sold at these prices. The Association then withdrew the balance of their former offer, and have now offered for sale 100,000 tons July at 15s. 6d., 100,000 tons August at 15s. 11d., 50,000 tons September at 16s. 6d., 50,000 tons October at 16s. 10d., 50,000 tons November at 17s. 3d., 50,000 tons monthly December to March at 17s. 8d., and 100,000 tons April delivery at 17s. per quintal, and in the closing days about 170,000 tons have been disposed of, making the total sales during the last fortnight about 1,030,000 tons at an average price of 16s. 9d. per quintal.

Annual Productive Capacity

The nominal annual productive capacity as shown above would now appear to be about 83½ million quintals, but it is estimated in authoritative quarters that the present labour supply in Chile, coupled with the difficulty of obtaining a sufficiency of oil and coal fuel, would be unlikely, even under free production, to produce more than about 60 million quintals (or about 2,715,000 tons) per annum. If, therefore, competition for the above necessary adjuncts to production is to be avoided, the continuance of the Association on its present lines, or at any rate a combination of producers to restrict production, appears advisable, at any rate until conditions again become normal.

The cost of production was unfavourably affected in the early months of the year by the rise in Chilean exchange to over 16d., but the subsequent steady reaction has again caused a considerable reduction, and that of the better placed oficinas now rules from 9s. to 10s. per quintal f.o.b., although in a few isolated cases it is understood to be as high as 12s. per quintal.

The Chilean Government recently announced an alteration in the method of payment of duty, which from August onwards will be paid as to 30 per cent. in gold, 30 per cent. in currency and 40 per cent. in drafts. This is an important concession to producers, materially reducing the amount actually payable in gold, which, by reducing the demand for gold, helps to keep the premium at a lower figure. This should result in the nominal amount of 2s. 4d. per quintal charged for export duty being stabilised at nearer this figure, whereas in the past it has occasionally amounted to as much as 3s. 6d. per quintal.

The year 1919 proved a lean one to producers, and in most cases their trading was confined to the sale of stocks carried over after the Armistice at about 9s. 2½d. per quintal; but this and next year, with sales up to date by the Association averaging over 15s. per quintal, promise to be the most profitable in the history of the industry. Occasional strikes have been reported at the nitrate ports during the six months, but have not been of long duration, and at the close a general strike exists at Iquique and a lock-out at Mejillones.

Sulphate of Ammonia

The selling price for home consumption during the past season has been about £21 to £22 per ton, and the largely increased consumption of fertilisers in this country has in consequence absorbed nearly 250,000 tons of the production owing to the higher prices ruling for nitrate. As prices have now been raised to £23 10s. to £26 per ton for this year, and £26 10s. to £27 10s. for next spring delivery, it remains to be seen whether consumers will buy so largely or give the preference to nitrate. The price for export has varied from £28 to £37 per ton to the colonies and £35 to £50 per ton to other countries.

Synthetic Nitrogen Products

An improvement in the coal position in Germany has resulted in some increase in production, and, although reliable figures are difficult to obtain, this probably now amounts to about 60 per cent. of the amount of Chilean nitrate imported into Germany before the war. In this country plants originally started by the Government during the war have been taken over by private enterprise, but it is probable that several years will elapse before the production of a nitrogenous fertiliser in any quantity will be attained.

Oil and Colour Chemists

Two New Instruments for Physical Laboratories

A MEETING of the Oil and Colour Chemists' Association was held at the Food Reform Restaurant, Furnival Street, London, on Thursday, June 24, Dr. R. S. Morrell presiding.

The formal business having been disposed of, Mr. A. E. Bawtree delivered an address and described two instruments that he had brought to the meeting. Before showing the instruments he referred to the new Institute of Physics which has just been inaugurated on the same lines as the Institute of Chemistry, and emphasised the need for a physical laboratory connected with a firm in addition to a chemical laboratory—or a physical section of the chemical laboratory. The difficulty in this connection was that there was hardly any apparatus obtainable suited to the requirements of the paint and varnish chemist, the only two instruments worthy, in his opinion, of mention being the Abbe refractometer and the Abel flash point apparatus.

The lecturer then showed an instrument for testing the specific gravity of substances (particularly of stiff pastes and other bodies which could not be measured in any other way), and showed how it was used. He said that in practice it had been found to be correct within 0·005. It was suitable for printing inks and other pastes, also for solid substances—samples of metal for example. It had even been found of use in testing ordinary crystalline chemicals such as acetate of lead. It was of great assistance in chemical analysis.

The second instrument shown was a viscometer. After describing and criticising both the Doolittle & Redwood instruments, Mr. Bawtree described his own apparatus, explaining its method of operation and its advantages. Among the points to which he drew attention was a phosphor bronze disc, a small hole in which fulfilled the same function as the agate hole in the Redwood instrument. In practice, Mr. Bawtree said he had found it convenient to take tests at pressures which were double one another—25, 50, 100, 200, 400 and 800 had been found most convenient. When taking a test an eye should be kept on the mercury scale, because, obviously, as the liquid went down there would be a slight leakage; an occasional touch with the pump would restore the balance. The instrument was easily cleaned; with it force and velocity were both under control, and both were measureable. The orifice being completely immersed in the liquid meant that oxidation, evaporation, and cooling were avoided. There was no need to work with heated liquids; they could work with them at temperatures where they wanted to know their properties. It was a great advantage to be able to work at atmospheric temperatures without worrying about the thermometer. Being able to work at very great pressures they were able to record the viscosity of things that could not be conveniently treated in any other way—printing inks and similar substances—but in such cases it was convenient to work with an orifice with a diameter of a little over 3 millimetres. The instrument had only been completed three weeks, but tests showed a high degree of accuracy.

With regard to the figures obtained in glycerine tests the lecturer said that the readings varied from day to day because the temperatures were different; but whatever the temperature there was a tendency for the figure to decline. His explanation was that glycerine, for some reason hitherto unsuspected, existed in a state of tension, and this state of tension had to be broken down before it would behave as a perfect fluid.

An illuminating fact about the varnish experiments was that there was a loss of viscosity when spirit was added; it was very useful when compounding varnishes to know how they would behave with a certain amount of dilution. Another point was that the falling off in viscosity was greater at the higher than at the lower temperature.

Discussion

In the discussion which followed the Chairman said Mr. Bawtree had criticised the Doolittle method rather severely. It had its errors, undoubtedly, but a modification had been suggested which had eliminated many of the defects. This was a fluid method, but the instrument was rather difficult to make, and unfortunately did not appear in many works' laboratories. He agreed with Mr. Bawtree that the Redwood viscometer was not a desirable instrument; he generally used the Ostwald, and many of the official specifications now out for viscosity referred to this instrument, where the density factor had to be considered. The instrument which Mr. Bawtree had described was an exceedingly useful one and ought to be given a very good trial.

Mr. H. H. Morgan said the peculiar effect of glycerine to which Mr. Bawtree had called attention seemed to require further explanation.

Mr. R. P. L. Britton said that glycerine was a crystalline body at the temperature they generally used it. They might assume some kind of structure, but this structure had not been noted in any scientific works on the subject. He had not quite understood Mr. Bawtree's reference to the measurement of the height of the liquid in the cylinder itself, because Mr. Bawtree regulated the rate of flow in the material through the orifice and the height to which it rose in the cylinder by a nail which was only approximately adjusted. The approximate adjustment of that nail might mean a considerable error. He did not agree that phosphor bronze was a very good material for the orifice itself, because they dealt with acid bodies—bodies which they knew affected phosphor bronze very considerably. He wondered how accurately these orifices could be adjusted, and if they could be readily renewed?

Mr. Bawtree, in reply, said with regard to the use of phosphor bronze that this was a good deal more resistant than any other form of bronze or alloys; so much was this the case that it was used in apparatus for measuring chlorine gas. With regard to replacing orifices, these were comparatively cheap, and could be readily replaced; they could also be readily tested by having a wire of the same bore as the orifice. If the wire would just go into the orifice, that showed it was all right; but if the wire went through a little bit easily, that showed an almost immeasurably small increase in the size of the orifice. It must be borne in mind that an agate orifice was exceedingly liable to accident. The fine ground right-angled edge at the end of it was very brittle and liable to microscopic fracture, and this had an enormous effect upon the results; whereas the tough phosphor bronze was not the least likely to accidental damage in that respect. The possibility of a slight acid action if the liquid were left too long in the orifice was of less importance than an unnoticed damage to an agate orifice upon which they might rely. Apparatus that was used by highly-trained chemists and college professors might be taken proper care of, but in commercial work apparatus was largely used by assistants, and it should be of a kind that could be safely entrusted to those assistants.

Other speakers took part in the discussion, and a hearty vote of thanks was accorded Mr. Bawtree at the close.

Brotherton-Ratcliffe & Co. v. Yankee, Ltd.

MR. JUSTICE DARLING, in the King's Bench Division, on Tuesday, June 29, heard an action brought by Brotherton-Ratcliffe & Co., Ltd., of Winchester House, E.C., against Yankee, Ltd., of High Street, Manchester, the plaintiffs seeking to recover £4,090 damages for alleged breach of contract by the defendants in failing to accept deliveries of saccharine sold to them.

Mr. Trapnell, for the plaintiffs, said that the contract, which was entered into in September, 1918, was for the sale by the plaintiffs to the defendants of 500 lb. of saccharine at 26s. per lb., delivery to be in October. The defendants only accepted 100 lb., although they were given up to January, and after that month the plaintiffs had to get rid of the goods at a much lower price. The defendants contended that the contract to buy the saccharine was conditional on the plaintiffs agreeing to take saccharine tablets of the defendants' manufacture, and that after taking 500,000 tablets plaintiffs refused to accept any more. The defendants were counter-claiming for damages in consequence of this refusal. The reason why the plaintiffs refused to take further deliveries of tablets was because those supplied were found to be useless.

His Lordship, giving judgment for the plaintiffs for the amount claimed, with costs, said he was sorry for the defendants as they appeared to have entered into the contract without quite appreciating the contract they were making, and also because there was no prospect of the world-storm then raging coming to an end.

Nickel as a Catalyst

AMONG the papers submitted at a meeting of the Royal Society on Thursday, June 24, was one (in a series on "A Study of Catalytic Actions at Solid Surfaces") by E. F. Armstrong, F.R.S., and T. P. Hilditch, D.Sc., on "The Rate of Change Conditioned by a Nickel Catalyst and Its Bearing on the Law of Mass Action."

It was pointed out in the paper that the hydrogenation of selected simple organic compounds containing one ethylenic linkage had been studied with reference to the indications of a linear relation between the amount of hydrogenation and time which were observed in the case of mixtures of unsaturated glycerides (Part I. of this series). It was now found that this relation, in the case of methyl and ethyl cinnamates, safrol or anethol (when hydrogenated in the liquid state in presence of nickel at 140°C. or 180°C.) took a linear form for at least 60 per cent., and in most cases 80 to 90 per cent., of the whole action. The interpretation of the mechanism of the action which the authors deduced from the work on unsaturated glycerides thus received experimental confirmation.

Further experiments illustrated the manner in which the linear graphs for absorption of hydrogen/time might be transformed into curves, generally of a logarithmic type, by the influence of external conditions. The analogies between these variants of the normal hydrogenation action and similar influences in enzymic hydrolysis was discussed.

The general results of the investigations dealt with in this series of papers were discussed from a theoretical standpoint, with particular reference to the modern development of de la Rive and Marcet's intermediate compound theory of catalysis, to the different points of view of catalysis taken at present by physicists and by chemists, and to the work of Lord Rayleigh, W. B. Hardy and Langmuir on the chemical nature of "adsorption," the latter effect involving the concentration of a single layer of molecules at a surface.

French Chemical Industry

THE great unsteadiness of prices in the chemical market is reacting strongly on the development of chemical industry since high cost of raw material leads to the use of cheaper substitutes, and the introduction of these often entails radical changes in both processes and plant. The situation is made worse by the wastage and absence of method noticeable in many works, and in many cases the quality of the manufacture is sacrificed to the imperative need for increased production. However, these obstacles are gradually being overcome by the combination of the leading chemical firms, which realise more and more that co-operation is the keynote of progress. There is a great demand for acetic acid, sulphuric acid and formaldehyde, the 40 per cent. solution of the last named being unobtainable even at 20 fr. per kg. Tartaric and citric acids, owing to the "dry" policy in the United States, are very scarce, and offers of 25–26 fr. per kg. and 30 fr. per kg., respectively, have been made. Mineral colours are also in great demand. The price of mercury has gone up to 37–38 fr. per kg.; the demand has much increased owing to its use in synthetic production of alcohol and acetic acid. Potassium salts are rare, and the carbonate is barely obtainable at 750–800 fr. per quintal, which is a serious matter for glass manufacturers.

In spite of the many difficulties which have lately handicapped production, it seems as if maximum prices for metals have at last been reached; although demand exceeds supply, prices have to be lowered to enable any business to be done. The decline in the prices of metals extends practically to all except aluminium, which remains firm at 10,500 fr. per ton.

It was stated some time ago in German papers that France had undertaken to supply Germany with 200,000 tons of iron ore for each of the months of May and June. This promise was, indeed, made; but on the clear understanding that Germany should send fuel in return, and especially metallurgical coke. As Germany has not yet fulfilled her obligations to the extent stipulated in the Peace Treaty, it is hardly likely that the importation of iron ore into that country will exceed 50,000 tons for May.

The production of coal during April, 1,762,000 tons, against 1,451,506 tons in March, is still much below normal. German coal is arriving at the rate of 1,000,000 tons a month, which is a great improvement. American coal comes in at the rate of 180,000 tons a month, and there are strong reasons to hope that before long this figure will be brought to 300,000 tons. Never has the British exportation of coal reached such a low level. It is estimated that the total for 1920 will be about 30 million tons below that for 1919.—*Jour. Soc. Chem. Ind.*

A. Boake, Roberts & Co.

Issue of New Capital

AFTER payment of the dividends on the preference shares and 16 per cent. in all on the ordinary shares, providing £4,561 for bonus to employees and commissions, £227 for war allowances to undemobilised members of H.M. Forces, £6,348 for income-tax, transferring £8,714 to capital account, and £15,000 to reserve (making £40,000), the accounts for the year ended March 31 last show a credit balance of £10,191 to be carried forward. Last year the dividends were the same; £9,103 was provided for bonus to employees and commissions; £876 for war allowances; £7,610 for income-tax; £5,000 to reserve; and £6,606 was carried forward. The company which has a share capital (all issued and fully paid) of £300,000 divided into 20,000 ordinary shares of £10 each, and 10,000 5 per cent. cumulative preference shares of £10 each, is now offering for subscription £50,000 six per cent. (registered) debentures of £100 each, ranking in every respect *pari passu* with the £50,000 debentures previously issued. The price of the debentures which are redeemable at par, is £92 per £100 debenture payable as follows: On application, £10 per cent.; on allotment, £22 per cent.; on August 1, £60 per cent. The debentures bear interest at the rate of 6 per cent. per annum, payable half-yearly on June 30 and December 31, each year, and a full half-year's interest will be paid on the present issue on December 31, 1920. The principal will be redeemed at par by annual drawings; debentures drawn being paid off on June 30 next following the drawing, so that the whole issue should be discharged by June 30, 1945, at the latest. The company was founded in 1870, and its business consists of the manufacture of a large variety of products used in the brewing and other fermentation industries, also technical and chemical preparations used in other manufactures. The widespread character of the output, and the fact that consumers are mainly supplied direct, independently of the middleman, gives stability to the trade. The war created an urgent demand for certain technical chemicals previously supplied from alien sources, and the vigorous response made by the company to this national need opened up new avenues of trade, and consequently greatly increased its scope of operations. The space required to accommodate the plant for the manufacture of these new goods, coupled with the expansion of the general business, has absorbed the whole of the available land in the present works (about 4 acres) and the directors feel that the time has come for additional premises to be acquired, into which some departments of the business may be transferred so that room may be available for further development. The serious rise in price of all raw materials has greatly increased the cash locked up in stocks carried, causing an undue encroachment on the working capital. The object of this issue is to pay off temporary loans and to strengthen the working capital in such measure as will ease the carrying on of the business and facilitate the handling of increased output. As illustrating the progress the company has made since its formation in 1897, it may be stated that the assets were then valued at £76,185, whereas they are now valued at £422,648, whilst no additional capital has been brought into the business except the first moiety of these debentures.

Pulp from Sweden

WE are informed that Mr. Marshall, the new manager of the pulp and chemical department of Relph, Darwen & Pearce, of London, has now returned from his business journey to Scandinavia. As the result of an agreement arrived at with a prominent Swedish firm controlling several pulp mills, Relph, Darwen & Pearce will in future be in a favourable position to supply various brands of pulp.

Action by the Pacific Phosphate Co

War Effect on Contracts

ON Tuesday and Wednesday, in the King's Bench Division, Commercial Court, Mr. Justice Rowlatt heard an action by the Pacific Phosphate Co., Ltd., of Sutherland House, Lloyds Avenue, E.C., against the Empire Transport Co., Ltd., of Leadenhall Street, E.C., for a declaration that a contract of August 30, 1913, was a valid and subsisting contract.

Sir John Simon, for the plaintiffs, said the point in this case arose on a commercial policy and the question at issue was whether or not a contract which existed between the plaintiffs and the defendants was still alive or not. The plaintiffs said that when regard was had to its terms and the circumstances surrounding it, the contract was alive. The plaintiff company was an English company, and it was the owner of concessions for mining phosphates on two islands in the South Pacific, viz., Ocean Island and the Island of Nauru. The contract was with a shipping company to provide over a series of years ships to ship the phosphates. Of the phosphates shipped Europe took a third, Australia a third, and the remaining third went to other parts of the world. Before the war the greater part shipped to Europe was shipped to certain North German ports. The defendant company was wholly controlled by Messrs. Houlder Brothers, and they made three contracts with the plaintiffs. The third one was dated August 30, 1913, and was the document under which the Court was asked to decide. It provided that the plaintiffs were to have 12 steamers a year from 1914 to 1918, and his case was that the contract was that the defendants were to provide the use of ships.

Sir John said the clause in the agreement that called for construction was clause 9, which was as follows :—

> In the event of war in which Great Britain is engaged and which is likely to affect the safety of the steamers or their cargoes, shipments might at the option of either party be suspended until the termination of the war, and the period of such suspension shall be added to the end of the contract period.

The question was, what was the termination of the war for the purpose of the clause, and Counsel said that was January 10 last year, the date fixed by Parliament for the termination of the war with Germany.

Defendants denied liability in the matter and said that the contract was frustrated and dissolved, and they are under no liability or obligation to the plaintiffs.

Mr. Dickinson, giving evidence in support of the plaintiffs' case, stated that the Government had bought the two islands for 3½ millions.

Mr. Wright said his case was that this contract was long since dead and was clearly frustrated.

Evidence was called to show the enormous loss that defendants would suffer if they had to perform the contract now at prices fixed under the agreement of 1913.

His Lordship held that the contract had come to an end by reason of frustration by events not contemplated by the parties. Judgment was given for the defendants with costs.

Chemists' Manufacturing Co. v. Owens & Co

ON Tuesday, in the Commercial Court, King's Bench Division, Mr. Justice Rowlatt had before him an action by the Chemists' Manufacturing Co., Ltd., of Newington Causeway, against Owens & Co., of Temple Chambers, Temple Avenue, E.C., for damages for alleged breach of contract to deliver glass bottles.

Mr. Raeburn, K.C., for the plaintiffs, said his clients under a contract purchased a quantity of glass bottles or glasses of a medicinal character. There was no delivery at all under the contract which the defendants repudiated. The plaintiffs claimed the sum of £257, being the difference between the contract price and what they would have bought from someone else. The defendants said there was no contract at all, that there was no memorandum or contract within section 4 of the Sale of Food Act, and that a reasonable time for delivery had not expired. Counsel said the contract was contained in the correspondence and was for delivery within a reasonable time after four to six weeks from September, 1919. Defendants having repudiated the contract, could not now say that reasonable time for delivery had not expired.

Evidence was called on behalf of the plaintiffs and for the defence, and his Lordship reserved judgment.

Higher Parasitic Fungi

A PRELIMINARY communication on the "Chemical Characteristics of Some Torulæ Related to Higher Parasitic Fungi" was made to the Liverpool section of the Institute of Chemistry recently by Dr. George Tate. As preface to his communication, Dr. Tate gave a sketch of the nature of the fungi that are parasitic upon plants, and detailed the life history of the white rust fungus that attacks cruciferous plants; also the rust fungus of some of the grasses that starts its cycle of life as a cluster cup or accidium on the leaves of the common coltsfoot weed. Emphasis was laid on the polymorphism of the parasitic fungi, and the power many have of spending a cycle of life on intermediary "host plants," thereby apparently acquiring new vigour and increased virulence as plant diseases. As very few of these intermediary hosts are known, any chemical knowledge acquired respecting the characteristics of parasitic fungi should be of use in recognising them, and hence obtaining more knowledge of their intermediary hosts.

In the course of investigations, Dr. Tate observed that the spores of many parasitic fungi when brought on to suitable nutrient media give rise to saprophytic growths of torulæ, or simple budding fungi. Many of these he has isolated and grown as pure cultures, with the view of determining their characteristics. Trials are being made to observe whether these toruloid conditions can give rise to the same plant diseases as those produced by the higher fungi from which they were obtained.

In illustration of the different types of torulæ obtainable, the lecturer showed torulæ from two different species of smut or ustilago—viz., the smut of barley and the smut that attacks the anthers of the campions. The former hydrolyses cane sugar and raffinose, whereas the latter does not. The torulæ from the barley smut use up starch and glycerine; those from the anther smut use up no recognisable proportion. Microscopic observations indicated that these torulæ were phase forms of the higher parasitic forms, conclusions more or less confirmed by obtaining from the anther smut the same torulæ from diseased plants from widely separated districts and at different seasons of the year. A further example given was of the torulæ obtained from two species of cystopus—viz., cystopus candidus and cystopus spinulosus—that showed notable differences in their attack on cane sugar.

Analagous growths on solid culture media were exhibited as having been obtained from the Uredo, or summer spores of Uredines fungi, and from the peronospera parasitic upon cruciferous plants. Torulæ have not so far been obtained from the teleuto or winter spores of the uredines.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. NO.
Winnipeg ...	Colours in Oil; White Lead... ...	931
Liege	Zinc	934
Hamburg ...	Olive Oil	938
Italy (Brescia) ...	Pig Iron; Zinc	940
Brescia	Oil Seeds	941
Mexico	Cyanide...	949
Columbia and Venezuela	Paints and Varnishes	948
Egypt	Palm Oil Soap. (Particulars from Sir A. L. Webb, K.C.M.G. Queen Anne's Chambers, Westminster, S.W.1.)	950
Toronto	Druggists' Supplies	—
Brazil ... ... (Sao Paulo)	Chemicals; Lubricating Oils; Anilines	978
Sao Paulo ...	Chemicals	979
Zurich	Chemicals	974
Gothenberge ...	Soda (Ash and Crystal); Glue; Gelatin; Shellac; Gum Tagacanth; Boric Acid; Sodium Sulphide	973
Algeria, Tunis ...	Sulphate of Copper; Soap; Candles	976

From Week to Week

DR. A. KIRPAL has been appointed professor of chemistry at Prague University.

DR. T. SLATER PRICE has been appointed director of research to the British Photographic Research Association.

The University of Aberdeen and North Scotland College of Agriculture invite applications for two posts in biochemistry.

Mr. S. N. JENKINSON, managing director of Webb's Crystal Glass Co., Ltd., has been appointed chairman of the Council of the Pottery and Glass Trades Bsnevolent Institution.

Among the recipients of honorary degrees of D.Sc. at Oxford Encænia last week were Lieut.-General Sir Alfred Keogh and Sir Richard Glazebrook.

MR. H. F. HOLDEN, B.A. (St. Johns), has been elected by Cambridge Unive sity to the Benn W. Levy research studentship in biochemistry.

The Senate of the University of London has made a grant of £30 for the year 1920-21 out of the Dixon Fund to Mr. A. S. E. ACKERMAN, B.Sc. (Eng.), for researches into the physical properties of clay.

On the occasion of the laying of the foundation stone of the new chemistry department of EDINBURGH UNIVERSITY during the Royal visit to the Scottish capital the Queen has consented to accept the honorary degree of LL.D.

DR. V. J. HARDING, associate professor of biological and physiological chemistry at McGill University, has been appointed professor of pathological chemistry in the University of Toronto.

The product of the pyrites mines which are working in British Columbia, Quebec, and Ontario is, it is stated, used for the MANUFACTURE OF SULPHURIC ACID in Canada by at least six companies.

MR. JULIAN BAKER, chairman of the London section of the Society of Chemical Industry, has been appointed editor of the *Journal of the Institute of Brewing*, vacant by the resignation of Prof. A. R. Ling.

It is announced that a SCOTTISH GLASS COMBINE is shortly to be floated with a capital of about £1,000,000. Four firms are at present concerned in the scheme, and new works are to be erected in Edinburgh. All kinds of glass will be manufactured, including optical and scientific glassware.

We regret to learn that, owing to very serious illness, MR. JOHN GRAY will be unable to preside at the annual general meeting of the Society of Chemical Industry in Newcastle this month. Professor Louie has kindly agreed to undertake the duties of acting president during the meeting.

The Chandler Medal of the American Chemical Society has been presented to DR. W. R. WHITNEY, director of research to the General Electric Co. at Schenectady, formerly professor in the Massachusetts Institute of Technology.

A licence for M. Claude's process for obtaining synthetic ammonia from atmospheric nitrogen has been obtained for the United Kingdom and Colonies by the BRITISH CUMBERLAND COAL POWER & CHEMICALS, LTD., while the exclusive licence for Japan and China has been secured by Suzuki & Co.

THE FOLLOWING DECORATIONS have been conferred upon British chemists for valuable services rendered during the war: By the King of Italy: Officers of the Order of St. Maurice and St. Lazarus—Dr. T. M. Lowry, Prof. P. F. Frankland. By the King of the Belgians: Officer of the Order of the Crown—Dr. E. J. Russell; Commander—Dr. W. R. Dunstan.

For a paper on "The Oil Resources of the British Empire," read recently at a joint meeting of the Indian and Colonial Sections of the Royal Society of Arts, Sir JOHN CADMAN is among those awarded the medal of the Society for papers read before it during the session 1919-1920. A report of the paper appeared in our issue of June 12.

With reference to the circular issued by the London Pioneer Syndicate, Ltd., offering South African Mining Syndicate shares in exchange for STANDARD OIL OF MEXICO shares, the directors of the Standard Oil Co. of Mexico, Ltd., state that this circular is entirely unauthorised by them. Negotiations of considerable importance are, they state, actually in progress regarding the company's property in Mexico, and the board are hopeful of being able to make a satisfactory announcement at a comparatively early date.

Chemical Matters in Parliament

Oil in Mesopotamia

Mr. LLOYD GEORGE, in reply to questions relating to the oil resources of Mesopotamia (House of Commons, June 28), stated: The ownership of the oil deposits in Mesopotamia will be secured to the Arab State as part of the administrative arrangements under the Treaty and mandate. There is no separate document dealing with this point. No final decision has been reached as to the method of working the fields, but it is clear that due consideration will have to be given to rights legally secured before the War. The Anglo-Persian Oil Company is a participant in a group claiming such rights. I am in communication with the French Government in regard to the publication of the terms of the Anglo-French Agreement in regard to Mesopotamia. In any case the interests of the State have been carefully safeguarded. It will obtain a return on the whole of the oil won, in the form either of royalties not yet fixed, or of profit on oil sold, according to the method of development adopted.

Mr. C. White asked the Under-Secretary of State for Foreign Affairs (House of Commons, June 29) what amount of the oil of the Bagdad and Mosul vilayets was conceded before the War by Turkey to a British or part-British company?

Mr. Kellaway: Assurances given by the Turkish Government before the War to the Turkish Petroleum Company covered the whole of the oil rights in the two vilayets mentioned.

Anglo-Persian Oil Co

In reply to questions by Mr. Swan regarding the Government's relations with the Anglo-Persian Oil Co., Mr. Baldwin stated that the sum of £4,250,000 had been paid to the Anglo-Persian Oil Co. under the authorising Acts of Parliament in payment for 5,000,000 ordinary shares, 1,000 preference shares, and 199,000 debentures. The interest and dividends received to December, 1919, amounted to £523,644. There was no market quotation for the ordinary shares, but their value was undoubtedly greater than when they were bought.

Increase in Fertiliser Prices

Mr. Edward Wood asked the Parliamentray Secretary to the Ministry of Agriculture (House of Commons, June 29) the reason for the increase in the price of fertilisers, and especially of basic slag; and whether the Government would consider the desirability of limiting the exportation of basic slag in order that an ample supply might be available for this country at reasonable prices?

Sir A. Boscawen: The reason for the increase in the price of fertilisers is the increased cost of production and enhanced demand. The prices which have been fixed for fertilisers for the 1920-21 season (which has only been done in the case of sulphate of ammonia and basic slag) are prices reached by agreement, and are not fixed by the exercise of any legal powers. In the case of basic slag, the relatively large advance in price is accounted for by the fact that there has been practically no advance for the last two years. The exportation of basic slag is, at present, severely restricted; a Bill is now before Parliament under which powers are sought to continue this restriction in respect of basic slag and of other fertilisers.

Muriate of Potash

Sir Robert Horne, in reply to Sir R. Cooper (House of Commons, June 28), stated that out of the quantities of muriate of potash received under the German potash contract, 4,000 tons of 80 per cent. muriate and 2,500 tons of 90-95 per cent. were exported from Hamburg to the United States with the consent of the Potash Distribution Committee, the prices fixed by the Committee being £17. 10s. and £19. 10s. per ton, respectively, f.o.b. Hamburg. There were no shipments from the United Kingdom or Rotterdam. No sulphate of potash received under the contract has been exported to the United States of America.

Lord Haig was the principal guest at a luncheon given on Thursday, June 24, by SIR MARCUS SAMUEL at the Leathersellers' Hall, when a cheque was handed over to him for £66,810 which had been subscribed to the Officers' Association by the petroleum and oil companies operating in Great Britain. SIR MARCUS SAMUEL, in handing over the cheque, remarked that Dutch and American friends had joined gladly in subscribing to this fund.

References to Current Literature

British

CARBONISATION. A comparative method of determining the heat of carbonisation of coal. G. Weyman. *J. Soc. Chem. Ind.*, June 30, 168-169T.

CEMENT. The setting of calcium sulphate cements. C. L. Haddon. *J. Soc. Chem. Ind.*, June 30, 165-168T. Experiments on the drying and the effect of sulphates on these cements are recorded.

CHARCOAL. Properties of wood charcoal. A. Pickles. *Chem. News*, June 25, 301-302. The preparation and properties of coconut shell charcoal are described.

CRESYLIC ACID. The analysis and composition of cresylic acid. J. J. Fox and M. F. Barker. *J. Soc. Chem. Ind.*, June 30, 169-172T.

ELECTRO-OSMOSIS. The commercial application of electrical osmosis. J. S. Highfield, W. R. Ormandy and D. Northall-Laurie. *J. Roy. Soc. Arts*, June 25, 514-523. The treatment of clay is dealt with particularly.

GAS. A study of the inverted incandescent gas burner. C. Killing. *Gas World*, June 26, 586-589.

GLASS. The development of various types of glass. C. J. Peddle. *J. Soc. Glass Tech.*, May. I. The interaction of silica with the oxides of sodium and potassium. 3-20. II. The interaction of silica, lime and sodium oxide. 20-45. III. The interaction of silica, lime and potassium oxide. 46-58. IV. The interaction of silica, lime and the oxides of sodium and potassium. 59-70. V. A comparison of the soda-lime-silica and the potash-lime-silica glasses. 71-107.

A suggested improvement in the manufacture of glass-house pots. C. W. Thomas. *J. Soc. Glass Tech.*, May, 107-111. The optical properties of some lime-soda glasses. J. R. Clarke and W. E. S. Turner. *J. Soc. Glass Tech.*, May, 111-115.

The thermal expansion of magnesia-containing glasses. S. English and W. E. S. Turner. *J. Soc. Glass Tech.*, May, 115-120.

The comparative effects of soda and potash in lead glass for table ware. F. W. Hodkin and W. E. S. Turner. *J. Soc. Glass Tech.*, May 120-125.

The density of soda-lime glasses. S. English and W. E. S. Turner. *J. Soc. Chem. Tech.*, May, 126-128.

NITROCELLULOSE. The neutral hydrolysis of guncotton, with a note on the alkaline hydrolysis of guncotton. E. Knecht and B. R. Bostock. *J. Soc. Chem. Ind.*, June 30, 163-165T.

The viscosity of solutions of nitro-cellulose in ether-alcohol. W. H. Gibson and R. McCall. *J. Soc. Chem. Ind.*, June 30, 172-176T.

OILS. Catalysis applied to the oxidation of oils. R. S. Morrell. *J. Soc. Chem. Ind.*, June 30, 153-155T. An interesting discussion of the subject.

Reports on oil seeds. *Imperial Inst. Publication*, 149 pp. Reports on the trade in Indian oil seeds.

PEAT. The peat resources of Ireland. *J. Soc. Chem. Ind.*, June 30, 213-214R. Abstract of lecture by P. F. Purcell before Royal Dublin Society.

PERFUMERY. Some alcohols and esters used in perfumery. L. G. Radcliffe. *Perf. Essent. Oil Rec.*, June 214-215.

PHOTOGRAPHY. Photographic images—visible and invisible. F. F. Renwick. *J. Soc. Chem. Ind.*, June 30, 156-163T. Hunter Memorial Lecture.

REFRACTORIES. The preservation of glass furnace refractories by water-cooling. E. B. Christmas. *J. Soc. Glass Tech.*, May 128-138.

SALICYLIC ACID. The melting point of salicylic acid. W. J. Bush & Co. *Perf. Essent. Oil Rec.*, June, 207.

French

ALLOYS. Light alloys of high resistance. Grard. *Rev. Mét.*, April, 286-302. Tests on aluminium-copper alloys are described.

ALUMINIUM. The aluminium industry in Germany during and after the war. L. Descroix. *Rev. Mét.*, April, 275-285.

HYDROGEN PEROXIDE. The catalytic decomposition of hydrogen peroxide by colloidal platinum. A. de Gregorio Rocasolano. *Comptes rend.*, June 21, 1502-1504.

MERCURY. The precipitation of mercuric salts by hydrogen sulphide. P. Jolibois and P. Bouvier. *Comptes. rend.*, June 21. 1497-1498. The precipitates formed under different conditions have been examined.

STEEL. Thermal alteration of the elastic properties of nickel steels. P. Chevenard. *Comptes rend.*, June 21, 1499-1502.

TAR. Modern technique of the coal tar industry. C. Berthelot. *Rev. Met.*, May, 252-274. A continuation of articles already noted (*Chem. Age*, 1920, 445, 612).

United States

BRONZE. Elastic properties of bronze castings. G. F. Comstock. *Chem. & Met. Eng.*, June 16, 1113-1118.

CEMENT. Effect of storage on cement. D. A. Abrams. *Bull. 6, Structural Materials Res. Lab., Lewis Inst., Chicago.* 28 pp. The strength of cement has been measured after different periods of storage.

CLAY. The storage and handling of raw clays. T. W. Garve. *J. Amer. Ceram. Soc.*, April, 266-285. Appropriate plant is described.

COKING. Recent by-product coke-oven development. J. Becker and F. W. Sperr. *Blast Fur. & Steel Plant*, June, 330-337. Developments in the construction of Koppers type ovens are described.

COBALT-OXIDE. Notes on cobalt-oxide. N. B. Davies. *J. Amer. Ceram. Soc.*, April, 322-325. The production and uses are described.

COPPER. Copper and magnetite in copper smelter slags. C. G. Maier and G. D. van Arsdale. *Chem. & Met. Eng.*, June 16, 1101-1107.

EMULSIONS. Separation of fixed oils from soap-water emulsions. E. E. Ayres. *Chem. & Met. Eng.*, June 9, 1057-1062.

ENAMELS. Titanium enamels. R. D. Landrum and L. J. Frost. *J. Amer. Ceram. Soc.*, April, 316-321.

FILTRATION. Scientific control of the filter station. A. Wright. *Chem. & Met. Eng.*, June 9 and 16, 1077-1080, 1119-1122. Continuation of article previously noted (*Chem. Age*, 1920, 697).

GAS. Special gas wash-bottle for use in the Referee's test for sulphur. A. E. Maze. *Chem. & Met. Eng.*, June 9, 1070.

GLASS. A practical test for the resistance of optical glass to weathering. F. R. v. Bichowsky. *J. Amer. Ceram. Soc.*, April, 296, 308.

Note on the mechanics of the weathering of glass. F. R. v. Bichowsky. *J. Amer. Ceram. Soc.*, April, 309-312.

METALS. Fatigue of metals under repeated stresses. H. F. Moore and J. B. Kommers. *Blast Fur. & Steel Plant*, June, 365-372.

NITROGEN. Nitrogen fixation by the Haber method. C. H. Jones. *Chem. & Met. Eng.*, June 9, 1071-1075. A description of the U.S. Government plant.

OILS. The Saybolt viscosity of oil blends. W. H. Herschel. *Chem. & Met. Eng.*, June 16, 1109-1112. Charts are given for computing the viscosity of mixtures.

POTTERY. A satisfactory method of using barium hydrate in terra-cotta bodies. M. E. Gates. *J. Amer. Ceram. Soc.*, April, 313-315.

POWER. Utilising blast-furnace gas for power. F. H. Willcox. *Blast Fur. & Steel Plant*, June, 337-340. A number of operating records are given.

STEEL. Notes on the acid open-hearth process for the manufacture of high-grade steel. B. de Maré. *Blast Fur. & Steel Plant*, June, 318-324. Also *Chem. & Met. Eng.*, June 9, 1063-1068. American Iron & Steel Institute Paper.

The use of the microscope and the heat treatment of steel. A. Sauveur. *Blast Fur. & Steel Plant*, June, 373-378. American Iron & Steel Institute Paper.

Miscellaneous

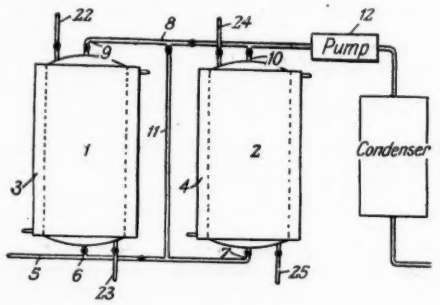
ANALYSIS. New industrial densimeter for gases. E. Hauser. *Anal. Soc. Espan. Fis. Quim.*, February, 79-82.

Patent Literature

Abstracts of Complete Specifications

122,169. SULPHONATING BENZENE, PROCESS OF. The Barrett Co., 17, Battery Place, New York, Assignees of C. R. Downs, Cliffside, N.J., U.S.A. International Convention date (U.S.A.), January 5, 1918.

In the sulphonation of benzene, the substituion of one or more hydrogen atoms of the aromatic nucleus by sulphonic acid groups results in the formation of water, which dilutes the reaction mixture and retards the sulphonation. The object is to remove this water as it is formed by effecting the sulphonation under vacuum. In forming the mono-sulphonic acid derivative, acid of 80°–98° per cent. strength is used at a temperature of 100°–140°C. and the benzene is introduced continuously whilst agitating the mixture. Under these conditions no material excess of benzene is removed by the vacuum. An absolute pressure of 0·8 to 1·3 inches of mercury may be employed at a temperature of 140°C. The di-sulphonic acid derivative is produced at a temperature up to 260°C., using a stronger acid, usually oleum, and in this case a pressure of 3 to 5 inches of mercury may be employed. The benzene

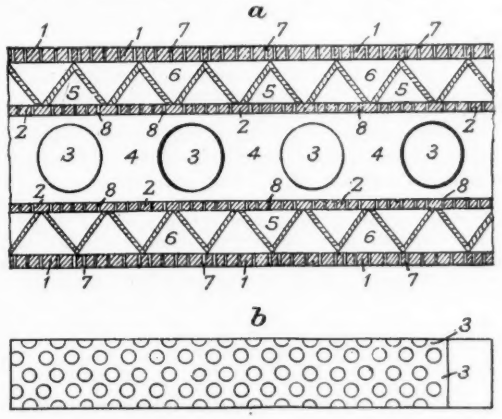


122,169

may be supplied in the liquid form or as vapour by the pipe 5 and branches 6, 7, to the two sulphonators 1, 2, which are heated by oil or steam jackets 3, 4. The vacuum is maintained by means of branch pipes 9, 10, and pipe 8 leading to a vacuum pump 12. A cross-connection 11 is provided between the inlet and outlet pipes, and controlling valves are provided in all the pipes. Supply pipes 22, 24 and discharge pipes 23, 25, are also provided. By a suitable manipulation of the valves, the two sulphonators may be placed in parallel, or in series, or one may be disconnected so that it may be discharged. When connected in series, the vacuum may be applied to the second sulphonator only, so that the pressure will be higher in the first sulphonator. Any benzene carried through the first sulphonator is thus subjected to sulphonation in the second. When benzene di-sulphonic acid is to be produced, the whole quantity of benzene may be initially added to the acid, mono-sulphonic acid being formed and also water. The diluted mixture may then be subjected to treatment as described above to complete the sulphonation.

143,602. CARBONISATION AND GASIFICATION PLANT AND THE LIKE. W. E. Davies, Brynawel, Vicarage Road, Penygraig, South Wales. Application date, February, 21, 1919.

The apparatus is for withdrawing gas or vapour from distillation, gasification or like plant, or from retorts for the synthetic production of ammonia. The structure illustrated may be central in the apparatus, thus providing a double retort, one on either side. The outside perforated wall may form a wall of the retort. Gas is withdrawn through the perforations 7 in the wall 1 into the triangular flues 6, and thence into the alternate triangular flues 5 by top or bottom connections. The gas then passes through the perforations 8 in the wall 2 into the central space 4, from which it may be directly withdrawn. Alternatively, perforated withdrawal pipes 3 may project into the space 4, and the gas may be drawn through them into a common discharge pipe. Nozzles may be arranged at the top or bottom of the flues 5, 6, for the admixture of any other gas or vapour desired. This construction enables gas to be withdrawn rapidly and with reduction of pressure, thus avoiding decomposition of the products. Com-



143.602

pare Specifications 131,105 and 136,880. *See* THE CHEMICAL AGE, Vol. I., page 398, and Vol. II., page 128.

143,619. and 143,620. ELECTROLYTIC RECOVERY OF METALS FROM SOLUTIONS. H. Wade, London. From The Central Mining & Investment Corporation, Ltd., Corner House, Commissioner Street, Johannesburg, Transvaal, South Africa. Application date, February 24, 1919.

143,619. The apparatus is for electrolytically precipitating gold and other metals from their solutions, especially those obtained by the cyanide process, by passing the solutions through a permeable cathode. The invention relates to the construction of the cathode. The cathode consists of a sheet of paper or felted fibre in which powdered conducting material, such as graphite prepared in the electric furnace, has been incorporated when in the pulp stage. The proportion of graphite used is as high as possible consistent with mechanical strength, and may be up to 85 per cent. The paper may be made from any vegetable fibre which shows by microscopical examination that it is capable of being readily coated with graphite. A depolariser such as powdered ferric oxide may also be added to the pulp. The cathode sheet may be mechanically strengthened by introducing a sheet of coarse muslin between two layers of paper. An electrical connection may be made by attaching the paper sheet to a sheet of wire cloth. When in use, a high current density is employed so as to produce a porous deposit of gold, which, when the flow of liquid becomes materially reduced, may be recovered by igniting the sheet and then fusing the metal.

143,620. When a permeable cathode constructed as above is used, blisters may be formed and the cathode polarised by the local evolution of hydrogen due to the use of a current of higher voltage than is necessary to precipitate the metal; such voltage is employed in order to reduce the free oxygen usually present in the cyanide solutions. The invention consists in de-oxygenating the solution prior to its electrolysis. The solution is sprayed from a perforated pipe into a closed vessel, which is kept under vacuum, so that air is extracted and withdrawn from the vessel. De-oxygenation may alternatively be effected by a preliminary electrolysis in which the oxygen is removed and the metal partly deposited. The remaining solution is then passed through a second electrolytic cell where the remainder of the metal is deposited.

143,641. COAL GAS, PURIFICATION OF. F. W. Berk & Co., Ltd., 1, Fenchurch Avenue, London, E.C.3, and J. J. Hood, 4, Canonbury Park North, London, N.1. Application date, February 28, 1919.

The process is for extracting sulphur compounds other than sulphuretted hydrogen, such as carbon bisulphide or thiophene, from coal gas. The gas is preheated to 200°–600°C. and passed

over granulated alumina heated to about the same temperature. The sulphur compounds are thereby converted into sulphuretted hydrogen which may then be eliminated by iron oxide or lime in the usual way. The alumina is preferably prepared from the tri-hydrate of alumina, but high-grade bauxite or granulated and ignited magnesite may alternatively be used.

143,651. ACID-PROOF AND OIL-PROOF CONTAINERS. T. W. Jones, Alltwen Hill, Pontardawe, South Wales. Application date, March 5, 1919.

An existing tank, *e.g.*, of iron, for containing acids is first coated with a relatively thin layer of a cement, such as Keene's cement, Martin's cement, Parian cement, or other hard finish plaster, and allowed to set for 24 hours. The surface is then washed with a refined petroleum spirit, such as petrol, and then coated with a mixture of shellac and rectified spirit or methylated spirit, with or without colouring matter. After a further 24 hours the tank may be used for containing acids. An acid-proof tank may be built by applying the cement to a frame or mould in sufficient thickness, and a reinforcement may be embedded in it. The acid-proof coating may then be applied.

143,681. SULPHONATED PRODUCTS OF MINERAL OILS AND PROCESS OF PRODUCING THE SAME. W. J. Mellersh-Jackson, London. From the Twitchell Process Co., 3223, Spring Grove Avenue, Cincinnati, Ohio, U.S.A. Application date, April 5, 1919.

The products are derived from the sludge layer resulting from the sulphonation of mineral oils of boiling point falling within the limits of the illuminating fraction; such sludge is usually regarded as a waste product in oil-refining processes. The sulphonic contents of the acid sludge are extracted with 1·5 to 2 parts of water when sulphur dioxide is evolved, and the free oil rises to the surface and may be decanted. The under layer of clear liquid is neutralised with lime, forming calcium sulphonate with the sulphonic acid and calcium sulphate with the free sulphuric acid. The calcium sulphate is filtered off leaving a clear, reddish liquid. Sodium chloride up to 20 per cent. of the weight of the solution is then added, when the mineral calcium sulphonate separates out leaving the colouring matter in the saline solution. The calcium sulphonate is filtered out and freed from liquid by pressing; it is readily soluble in cold water, giving a neutral solution, is of light yellow colour, plastic, and of aromatic odour. Barium, magnesium and aluminium sulphonates soluble in water may be similarly produced. The alkali-earth metal sulphonates may be used for splitting fats and oils, or for producing detergents, or as a base for the production of sulphonic acids. Detergents thus produced are suitable for use with hard water or sea water, since the calcium and magnesium sulphonates are soluble.

143,682. SULPHONIC ACIDS OF MINERAL OILS AND PROCESS OF PRODUCING THE SAME. W. J. Mellersh-Jackson, London. From The Twitchell Process Co., 3223, Spring Grove Avenue, Cincinnati, Ohio, U.S.A. Application date, April 5, 1919.

The process relates to the treatment of the sludge obtained from mineral oil distillates as described in 143,681 above, and the steps preceding the decomposition of the sulphonate are the same. Calcium sulphonate obtained as above is dissolved in water and sulphuric acid is added to precipitate calcium sulphate, which is filtered off. The solution is then treated with concentrated sulphuric acid, which causes the sulphonic acid to separate out. The acid is pink in colour, more soluble in water than in ether, forms water-soluble salts with calcium, magnesium and the like, and is less active in splitting fats and oils than sulphonic acids previously obtained from mineral oils. The acid is substantially free from the colour components of the sludge, and may be combined with an alkali or alkaline earth metal to produce a detergent.

143,683. ALKALI METAL SULPHONATE AND PROCESS OF PRODUCING THE SAME. W. J. Mellersh-Jackson, London. From The Twitchell Process Co., 3223, Spring Grove Avenue, Cincinnati, Ohio, U.S.A. Application date, April 5, 1919.

Calcium sulphonate is first obtained from sludge derived from mineral oil distillates, as described in 143,681 above, and is then converted into a detergent which can be used with hard water. The sulphonate is dissolved in water and treated with an equivalent amount of an alkaline salt, such as sodium carbonate. Calcium carbonate is precipitated and filtered off and the neutral sodium sulphonate remains and may be reduced to proper consistency for use as a detergent. It is soluble in less than an equal volume of water.

143,775. LIQUIDS, GASES AND THE LIKE, METHOD OF INTERMIXING. O. F. Bruman, Leysin-Village, Clinique la Primevere, Switzerland. Application date, September 10, 1919.

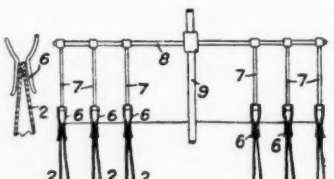
The apparatus is for mixing gases with liquids, or for mixing two or more liquids, more especially those having different specific gravities. The fluids to be mixed are supplied to a rotary turbine which is allowed to rotate at its racing or free running speed. Under these conditions no external work is done by the turbine, and the whole of the energy due to the pressure of the fluids is expended in internal solid and fluid friction, the latter producing an intimate mixing of the fluids. In order to regulate and keep the mixing operation constant, the turbine is coupled directly to an electric motor, the speed of which is equal to the racing speed of the turbine. The motor thus assists in driving the turbine if the fluid pressure is low, or acts as a dynamo, and consequently as a brake if the speed tends to become too high. The fluids may be passed in succession through a series of coaxial turbine rotors which are mounted either loose or fast on the common shaft.

NOTE.—The following specifications which are now accepted were abstracted when they became open to inspection under the International Convention: 131,600 (Soc. des Acieries et Forges de Firminy), relating to a process of manufacturing ethyl acetate from paraldehyde as the primary material; and 136,833 (Soc. Industrielle de Produits Chimiques), relating to a process for recovering ammonium and sodium sulphate from coke oven and like gases. *See* THE CHEMICAL AGE, Vol. I., page 556, and Vol. II., page 210.

International Specifications Not yet Accepted

142,077. EVAPORATORS FOR LIQUIDS. E. Wirth-Frey, Aaru, Switzerland. International Convention date, April 23, 1919.

The evaporator consists of a number of concentric annular chambers 2 and means are provided for removing solid matter deposited around the upper part of the walls of these chambers.



142,077

A number of scraper blades 6 are pressed resiliently against the walls and are carried by vertical rods 7 which are adjustably fixed to a common transverse horizontal rod 8 above the evaporating chambers. The whole structure is carried by a vertical shaft 9 so that the blades are revolved in contact with the walls, and thus remove the deposited material.

142,081. Basic magnesium hypochlorite. G. Kereszty and E. Wolf, Buda Pest, Hungary. International Convention date April, 19, 1919.

Magnesium oxide is suspended in water and chlorine passed into it in such amount that only about one-third to one-seventh of the magnesium oxide is attacked. The temperature is kept at 20°–22°C., and under these conditions basic magnesium hypochlorite is precipitated. The mixture is allowed to stand for a considerable time, when practically the whole of the chlorine is absorbed as hypochlorite, no appreciable amount of chlorate being produced. Alternatively, the mixture may be heated to 80°C. for six to eight hours, light

being excluded. The precipitate is washed with hot water and dried.

142,083. VULCANISING INDIARUBBER. A. Helbronner, 74, Boulevard Malesherbes, Paris. International Convendate, April 19, 1919.

When rubber compounds are vulcanised by hot air, litharge is replaced by reducing agents, such as hydroquinone, pyrogallol, tannins, paramidophenol, glycine, trioxymethylene, and other derivatives of formaldehyde, hydrosulphites, or neutral sulphites, up to 10 per cent. of the amount of rubber. Light-coloured products are thereby obtained.

LATEST NOTIFICATIONS.

145,035. Durable Cupric-ammonia cellulose solutions for spinning artificial thread or the like, process of preparation. Glanzfaden Akt.-Ges. October 12, 1917.

145,036, 145,037. Fertilisers, manufacture and production of. Badische Anilin and Soda-Fabrik. July 29, 1916, March 26, 1917.

145,038. Process for transforming ammonia into a salt for use as a fertiliser. Badische Anilin and Soda-Fabrik. March 23, 1918.

145,045. Leaching vegetable, animal, or mineral substances, process and apparatus for. Elektro-Osmose Akt.-Ges. January 9, 1915.

145,046. Decolorising liquids containing glycerine or crude glycerine. Elektro-Osmose Akt.-Ges. April 1, 1919.

145,053. Ortho-oxy-azo-dyestuffs, manufacture of new. Akt.-Ges. fur Anilin-Fabrikation. January 18, 1918.

145,054. Trisazo-dyestuffs, manufacture of new. Akt.-Ges. fur Anilin-Fabrikation. June 4, 1915.

145,055. Trisazo-dyestuffs capable of being diazotized, manufacture of. Akt.-Ges. fur Anilin-Fabrikation. June 29, 1915.

145,056. Ortho-oxy-diazo-dyestuffs, manufacture of. Akt.-Ges. fur Anilin Fabrikation. July 28, 1915.

145,057. Ortho-oxy-azo-dyestuffs, manufacture of. Akt.-Ges. fur Anilin Fabrikation. July 31, 1915.

145,058. Nitrogen-hydrogen mixtures suitable for the synthetic production of ammonia, process for the manufacture and production of. Badische Anilin and Soda-Fabrik. July 2, 1915.

145,059. Oxides of nitrogen from ammonia by catalytic oxidation, production of. Badische Anilin and Soda-Fabrik. April 1, 1916.

145,060. Urea, manufacture and production of. Badische Anilin and Soda-Fabrik. August 9, 1916.

145,071. Phthalic anhydride, manufacture and production of. Wohl, A. June 28, 1916.

145,079. Evaporation or inspissation of solutions, process and means for the—and also for effecting chemical reactions. Krause, G. A. January 29, 1917.

145,081. Protocatechuic aldehyde and protocatechuic acid from piperonal. Schmidt, L. September 15, 1913.

145,085. Sal-ammoniac skimmings, process for treating. Metallbank und Metallurgische Ges. February 28, 1918.

145,089. Process for recovering neutral oils from their "foots" or soap-stock. Ayres, E. E. May 21, 1917.

145,090. Liquids, process for refining. Ayres, E. E. October 3, 1917.

Specifications Accepted, with Date of Application

127,566. Alkali alumino silicates, Method for the decomposition of. E. Bergve. May 27, 1918.

138,078. Cellulose esters, Manufacture of dissolved or gelatinised. G. Bonwitt. June 6, 1917.

138,099. and 138,329. Glycerol from sugar, Manufacture of. Vereinigte Chemische Werke Akt.-Ges. April 12, 1915, and April 22, 1916.

144,336. Dyes, Production of water-soluble. A. M. Hart. December 13, 1918.

144,359. Porous refractory materials, Manufacture of. L. Denis. March 5, 1919.

144,398. Cyanogen from coal-gas, Recovery of. J. J. Hood. March 14, 1919.

144,478. Hydrogenising oils and fats, Apparatus for. Blair, Campbell & McLean, D. A. Blair & J. L. Ferguson. June 28, 1919.

144,503. Electric arc furnaces. British Thomson-Houston Co. and H. C. Hastings. July 17, 1919.

144,520. Gas-producers. J. F. Wells. September 1, 1919.

144,561. Filters. E. S. Arrighi. December 8, 1919.

Applications for Patents

Akt.-Ges. für Anilin-Fabrikation. Manufacture of sulphurised dyestuffs. 16,906, 16,907. June 22. (Germany, January 21, 1914.)

,, Manufacture of cellulose esters of organic acids. 16,908. June 22. (Germany, July 11, 1914.)

,, Manufacture of cellulose acetates. 16,909. June 22. (Germany, May 30, 1918.)

Allgemeine Ges. für Chemische Industrie. Heating-device in electrical resistance furnaces. 17,055. June 23. (Germany, March 13, 1919.)

,, Carrying out operations at high temperature in an air-free space. 17,056. June 23. (Germany, March 13, 1919.)

Audianne, P. Apparatus for manufacture of sulphuric anhydride. 16,731. June 21.

Badische Anilin & Soda-Fabrik. Production of solutions of cellulose acetates. 16,861. June 22. (Germany, February 9, 1914.)

Beard, F. J. Disinfectants and antiseptics. 16,799. June 22.

Bennert, C. Preparation of dye-baths. 16,892. June 22. (Germany, December 24, 1915.)

Bergve, E. Manufacture of alkaline reducing agents. 16,936. June 22.

British Cellulose & Chemical Manufacturing Co. Apparatus for supplying liquids under pressure. 16,763. June 21.

,, Cellulose-ester compositions. 17,435. June 26. (United States, June 30, 1919.)

British Dyestuffs Corporation. Manufacture of chlorinated derivatives of toluene. 17,037. June 23.

,, Manufacture of benzaldehyde derivatives and triphenylmethane colouring-matters. 17,038. June 23.

Burgess, Ledward & Co. and W. Harrison. Treatment of cellulosic fibres or substances. 16,649. June 21.

Clemo, G. R. Manufacture of benzaldehyde derivatives and triphenyl-methane colouring-matters. 17,038. June 23.

Clibbens, D. A. Manufacture of chlorinated derivatives of toluene. 17,037. June 23.

Crossley, P. B. Mica, mica compounds, &c. 17,066. June 23.

Durden, F. Apparatus for extraction of oils from nuts, seeds, &c. 17,206. June 24.

Farbenfabriken vorm. F. Bayer & Co. Manufacture of cyanamide derivatives of alpha-halogenated acids. 17,177. June 24. (Germany, November 22, 1915.)

,, Process for obtaining sulphur from hydrogen sulphide or from gases containing it or for purifying said gases. 17,178. June 24. (Germany, May 24, 1917.)

,, Process for treating or purifying gases containing hydrogen sulphide. 17,198. June 24. (Germany, July 3, 1918.)

Farbwerke vorm. Meister, Lucius & Brüning. Manufacture of methane. 16,757. June 21. (Germany, June 28, 1919.)

,, Manufacture of methane. 16,905. June 22. (Germany, July, 1, 1919.)

Feldenheimer, W. Catalysts and catalytic reactions. 16,917. June 22.

Fischer, F. Distillation of coal. 17,174. June 24. (Germany, November 13, 1916.)

Ganahl, C. F. de. Heat treatment of liquids. 16,776. June 21.

Green, A. G. Manufacture of chlorinated derivatives of toluene. 17,037. June 23.

Hewitt, J. T. Removal of liquids from pastes, wet precipitates, and crystalline magmas. 16,803. June 22.

Irinyi, A. Distillation of tar, &c. 17,347. June 25. (Germany, November 25, 1918.)

Ivinson, C. H. Paint, &c., impervious to oils, spirits, &c. 16,708. June 21.

Krupp, Akt.-Ges., F. Process for producing low carbon ferrochromium. 17,388. June 25. (Germany, July 27, 1916.)

,, Process for producing low carbon ferro-chromium. 17,392. (Germany, October 3, 1916.)

,, Process for producing low-carbon and low-silicium ferrochromium. 17,393. June 26. (Germany, January 11, 1918.)

Perkin, W. H. Manufacture of benzaldehyde derivatives and triphenyl-methane colouring-matters. 17,038. June 23.

Persapol Ges. Manufacture of soaps. 16,786. June 21. (Germany October 10, 1916.)

Plowman, W. W. Catalysts and catalytic reactions. 16,917. June 22.

Pratt, W. P. Sulphur-terpene compounds. 17,367. June 25.

Reinfurth, E. Process for manufacturing detergents. 17,475. June 26. (Germany, July 31, 1916.)

,, Process for manufacturing detergents. 17,476. June 26, (Germany, March 5, 1918.)

Paper Pulp from Peat

A method of producing different kinds of paper from peat pulp was demonstrated in Manchester College of Technology on Tuesday. Those responsible for the demonstration were Mr. A. L. Burlin, the inventor of the process of reducing the raw peat to pulp, and Mr. T. Cheetham Brooks, a Manchester drysalter, who is assisting Mr. Burlin to put his invention to practical use. After the test, Mr. Burlin exhibited specimens of the peat before and after its reduction to pulp, and specimens of different kinds of paper, variously coloured, made from the pulp.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

THURSDAY, July 1.

Business continues on the quiet side, but the demand has been somewhat better than has been the case recently. Changes in price are few and far between, and many products remain in short supply.

There is nothing very fresh to report in regard to export trade, but the volume of business passing continues to be fairly satisfactory.

General Chemicals

ACETONE is in steady demand and good business is passing.

ACID ACETIC is a shade firmer on the week, and a number of secondhand parcels appear to have been now absorbed.

ACID CARBOLIC is quiet and unchanged in price.

ACID CITRIC is lifeless and a turn easier.

ACID FORMIC is only in quiet demand at recent values.

ACID LACTIC is quiet and the value shows a tendency to droop.

ACID OXALIC is scarce for prompt delivery and makers are well booked up for the next three months.

ACID TARTARIC is only in poor demand, but price is firm.

AMMONIUM SALTS continue in steady demand, and there has been considerable enquiry on export account.

ARSENIC.—The Cornish make is demanding a higher figure, but there are lower offers of foreign make to arrive.

BARIUM SALTS are in steady demand at recent figures, and Chloride appears to be in slightly better supply.

BLEACHING POWDER is a nominal market, and secondhand parcels appearing are quickly snapped up on export account.

COPPER SULPHATE continues to be stagnant, and the price is again easier.

FORMALDEHYDE remains scarce for prompt delivery, and there are fewer parcels offering to arrive. The price is unchanged.

LEAD SALTS are easier in sympathy with the metal, but as the present values can only be described as distinctly moderate, the price would quickly respond to any increased activity in buying.

POTASSIUM PERMANGANATE is a shade lower in price, and is in rather easier supply.

POTASSIUM PRUSSIATE is enquired for for prompt delivery, and supplies are very scarce. Little foreign make is offering.

SODIUM CAUSTIC is firmer in tone, and parcels available are immediately absorbed on export account.

SODIUM NITRITE is quiet and unchanged in price.

SODIUM PHOSPHATE is in good demand, and the advance in price is maintained.

SODIUM PRUSSIATE is quiet and again easier.

TIN SALTS are extremely quiet and without feature.

ZINC SALTS are without change.

Coal Tar Intermediates

There is little of interest to report, and values are well maintained. Most manufacturers are booked up for months ahead.

ALPHA NAPHTHYLAMINE is in good request, and supplies are scarce.

ANILINE OIL and SALTS continue in good demand without change in value.

BETA NAPHTHOL is active but little can be obtained for near delivery.

DIPHENYLAMINE is in somewhat better request at last quoted prices, but very little is available.

PARANITRANILINE.—The advance in price is maintained, but all the business offering cannot be accommodated.

Coal Tar Products

Coal Tar products on the whole appear to be a little firmer since last week.

BENZOL, 90 per cent., is worth 2s. 1d. on rails.

PURE BENZOL.—The price for this is 3s. 3d. per gallon.

CREOSOTE OIL.—Is in good demand, and the price remains at 1s. to 1s. 1d. in the north, and 1s. 1d. to 1s. 2d. in the South.

CRESYLIC ACID.—Is firm at 4s. 6d. to 4s. 9d. for Pale, 97/99 per cent., and 4s. per gallon for the Dark, 95/97 per cent. quality.

SOLVENT NAPHTHA is slightly firmer at 3s. 2d. per gallon.

HEAVY NAPHTHA.—The price is still about 3s. 6d. per gallon, but supplies are difficult to obtain.

NAPHTHALENE.—There is a very good demand, but supplies are very difficult to obtain, manufacturers being very fully sold, Crude is worth from £16 to £20 per ton, while Refined is worth from £42 to £47 per ton.

PITCH.—The market is decidedly firm, and prices have an upward tendency. Business has been done at 185s. to 190s. f.o.b. East Coast, and there are buyers at the latter price f.o.b. London over next season, but sellers are scarce, and in most cases look for higher prices.

Sulphate of Ammonia

A small amount of business has been done for export at special prices, and the Home demand is good at the prices fixed by the Federation.

Current Prices

Chemicals

	per	£	s	d.		£	s.	d.
Acetic anhydride	lb.	0	3	6	to	0	3	9
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	120	0	0	to	125	0	0
Acid, Acetic, glacial, 99-100%	ton	110	0	0	to	115	0	0
Acetic, 80% pure	ton	95	0	0	to	96	0	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	74	10	0	to	76	0	0
Carbolic, cryst. 39-40%	lb.	0	1	3	to	0	1	3½
Citric	lb.	0	5	6	to	0	5	9
Formic, 80%	ton	115	0	0	to	120	0	0
Gallic, pure	lb.		8	6	to	0	8	9
Hydrofluoric	lb.	0	0	7	to	0	0	8
Lactic, 50 vol.	ton	60	0	0	to	62	0	0
Lactic, 60 vol.	ton	72	10	0	to	75	0	0
Nitric, 80 Tw.	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	2	11	to	0	3	0
Phosphoric, 1.5	ton	65	0	0	to	67	0	0
Pyrogallic, cryst	lb.	0	11	6	to	0	11	9
Salicylic, Technical	lb.	0	2	10	to	0	3	0
Salicylic, B.P.	lb.	0	3	8	to	0	3	10
Sulphuric, 92-93%	ton	8	0	0	to	8	10	0
Tannic, commercial	lb.	0	5	0	to	0	5	3
Tartaric	lb.	0	4	0	to	0	4	2
Alum, lump	ton	19	10	0	to	20	0	0
Alum, chrome	ton	93	0	0	to	95	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	17	10	0	to	18	10	0
Aluminium, sulphate, 17-18%	ton	20	10	0	to	21	10	0
Ammonia, anhydrous	lb.	0	2	2	to	0	2	4
Ammonia, .880	ton	52	0	0	to	57	0	0
Ammonia, .920	ton	42	0	0	to	46	0	0
Ammonia, carbonate	lb.	0	0	7½	to		—	
Ammonia, chloride	ton	115	0	0	to	120	0	0
Ammonia, muriate (galvanisers)	ton	60	0	0	to	65	0	0
Ammonia, nitrate	ton	60	0	0	to	65	0	0
Ammonia, phosphate	ton	130	0	0	to	135	0	0
Ammonia, sulphocyanide	lb.	0	2	3	to	0	2	6
Amyl, acetate	ton	410	0	0	to	420	0	0
Arsenic, white, powdered	ton	65	0	0	to	75	0	0
Barium, carbonate	ton	14	10	0	to	15	0	0
Carbonate, 92-94%	ton	14	10	0	to	15	0	0
Barium, chlorate	lb.	0	1	0	to	0	1	1
Chloride	ton	34	0	0	to	36	0	0
Barium, Nitrate	ton	55	0	0	to	56	0	0
Sulphate, blanc fixe, dry	ton	25	10	0	to	26	0	0
Sulphate, blanc fixe, pulp	ton	15	10	0	to	16	0	0

	per	£	s.	d.		£	s.	d.
Bleaching powder, 35-37%	ton	18½	0	0	to	—		
Borax crystals	ton	41	0	0	to	42	10	0
Calcium acetate, Brown	ton	20	0	0	to	21	0	0
,, Grey	ton	35	0	0	to	37	10	0
Calcium Carbide	ton	30	0	0	to	32	0	0
Chloride	ton	9	10	0	to	10	10	0
Carbon bisulphide	ton	58	0	0	to	59	0	0
Casein, technical	ton	80	0	0	to	83	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	8	0	to	0	8	3
Oxide, black	lb.	0	10	0	to	0	10	3
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	45	0	0	to	46	0	0
Cream Tartar, 98-100%	ton	295	0	0	to	300	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	345	0	0	to	350	0	0
Formusol (Rongalite)	lb.	0	4	0	to	0	4	3
Glauber salts	ton	Nominal.						
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	50	0	0	to	52	0	0
Iron sulphate (Copperas)	ton	4	15	0	to	5	0	0
Lead acetate, white	ton	90	0	0	to	92	10	0
Carbonate (White Lead)	ton	70	0	0	to	72	10	0
Nitrate	ton	72	0	0	to	75	0	0
Litharge	ton	62	10	0	to	65	0	0
Lithopone, 30%	ton	58	0	0	to	60	0	0
Magnesium chloride	ton	15	10	0	to	16	10	0
Carbonate, light	cwt	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	14	0	0	to	14	10	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	190	0	0	to		—	
Sulphate	ton	105	0	0	to	110	0	0
Methyl acetone	ton	95	0	0	to	100	0	0
Alcohol, 1% acetone	gall.	Nominal.						
Nickel ammonium sulphate, single salt	ton	60	0	0	to	64	0	0
Potassium bichromate	lb.	0	2	2	to	0	2	3
Potassium Carbonate, 90%	ton	115	0	0	to	120	0	0
Chloride	ton	Nominal.						
Chlorate	lb.	0	0	10	to	0	0	10½
Meta-bisulphite, 50-52%	ton	270	0	0	to	280	0	0
Nitrate, refined	ton	70	0	0	to	72	0	0
Permanganate	lb.	0	5	9	to	0	6	0
Prussiate, red	lb.	0	5	3	to	0	5	6
Prussiate, yellow	lb.	0	2	3	to	0	2	4
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	5	15	0	to		—	
Seconds	cwt.	6	0	0	to		—	
Sodium acetate	ton	61	0	0	to	63	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	1	11	to	0	2	0
Bisulphite, 60-62%	ton	50	0	0	to	52	10	0
Chlorate	lb.	0	0	5¾	to	0	0	6½
Caustic, 70%	ton	45	0	0	to		—	
Caustic, 76%	ton	46	0	0	to		—	
Hydrosulphite, powder, 85%	lb.	0	4	0	to	0	5	0
Hyposulphite, commercial	ton	37	10	0	to	40	0	0
Nitrite, 96-98%	ton	100	0	0	to	105	0	0
Phosphate, crystal	ton	40	0	0	to	42	0	0
Perborate	lb.	0	2	2	to	0	2	4
Prussiate	lb.	0	1	8	to	0	1	8½
Sulphide, crystals	ton	30	0	0	to	32	0	0
Sulphide, solid, 60-62%	ton	62	10	0	to	65	0	0
Sulphite, cryst.	ton	15	10	0	to	16	10	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Nitrate	ton	90	0	0	to	95	0	0
Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	24	0	0	to	26	0	0
Roll	ton	24	0	0	to	26	0	0
Tartar emetic	lb.	0	3	4	to	0	3	5
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb	0	2	0	to	0	2	1
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	82	10	0	to	85	0	0
Oxide, 94-95%	ton	70	0	0	to	72	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	4	0	to	0	4	3
Alphanaphthol, refined	lb.	0	5	0	to	0	5	3
Alphanaphthylamine	lb.	0	4	0	to	0	4	3
Aniline oil, drums extra	lb.	0	1	8	to	0	1	9
Aniline salts	lb.	0	1	10	to	0	2	0
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	5	6	to	0	6	0
Benzidine, base	lb.	0	12	6	to	0	13	6
Benzidine, sulphate	lb.	0	10	0	to	0	11	0
Benzoic, acid	lb.	0	5	6	to	0	6	0
Benzoate of soda	lb.	0	5	6	to	0	6	0
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	5	3	to	0	5	6
Betanaphthylamine, technical	lb.	0	8	6	to	0	9	6
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3
Dichlorbenzol	lb.	0	0	6	to	0	0	7
Diethylaniline	lb.	0	7	9	to	0	8	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	4	to	0	1	6
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	2	3	to	0	2	6
Dimethylaniline	lb.	0	5	0	to	0	5	6
Diphenylamine	lb.	0	5	0	to	0	5	3
H-Acid	lb.	0	14	6	to	0	15	0
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	5	6	to	0	6	0
Naphthionate of Soda	lb.	0	6	0	to	0	6	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	6	to	0	6	6
Nitronaphthaline	lb.	0	1	3	to	0	1	4
Nitrotoluol	lb.	0	1	4	to	0	1	6
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	2	to	0	1	4
Orthotoluidine	lb.	0	2	6	to	0	2	9
Orthonitrotoluol	lb.	0	1	7	to	0	1	8
Para-amidophenol, base	lb.	0	15	0	to	0	16	0
Para-amidophenol, hydrochlor	lb	0	15	6	to	0	16	6
Paradichlorbenzol	lb.	0	0	6	to	0	0	8
Paranitraniline	lb.	0	8	3	to	0	8	9
Paranitrophenol	lb.	0	2	6	to	0	2	9
Paranitrotoluol	lb.	0	5	3	to	0	5	6
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	6
Paratoluidine	lb.	0	7	6	to	0	8	6
Phthalic anhydride	lb.	0	5	6	to	0	6	0
R. Salt, 100% basis	lb.	0	4	0	to	0	4	2
Resorcin, technical	lb.	0	11	6	to	0	12	6
Resorcin, pure	lb.	0	17	6	to	1	0	0
Salol	lb.	0	5	9	to	0	6	0
Shaëffer acid, 100% basis	lb.	0	3	6	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	5	to	0	1	6
Tolidine, base	lb.	0	10	6	to	0	11	6
Tolidine, mixture	lb.	0	3	0	to	0	3	6

Manchester Chemical Trade

SIR S. W. ROYSE & CO., LTD., in their monthly circular, state: Following on the Whitsuntide holidays the month opened with only a quiet demand for most articles, but there has subsequently been some recovery and a fair volume of business has recently been put through both for home and export. Prices on the whole remain steady. There has been little business in sulphate of copper, and price is easier in sympathy with the fall in copper. The Board of Trade returns show a considerable decline in the quantities exported during the last five months—viz., 15,459 tons, as compared with 26,675 tons during the corresponding period of 1919. Green copperas has been in good demand both for home and export account. Acetate of soda is easier with increased offerings from abroad, although acetic acid is very firm. Acetates of lead have been moving only slowly, and with the fall in the metal nitrate of lead has but a limited sale. Carbonate of potash continues in quiet demand and price remains steady. Montreal potashes have been in better supply and have met with a ready sale. White powdered arsenic is again dearer and little is offering for near delivery. Yellow prussiates of potash and soda have been quieter, and there has been some pressure of sales at slightly lower figures. Tartaric acid is moving freely for both home and export account, and price is firm. Citric acid is unchanged. Cream of tartar is still in short supply. Makers of bichromates

have advanced their prices; re-sale parcels are very scarce and realise considerable premiums. Oxalic acid is easier with arrivals of foreign supplies. The heavy demand continues for borax and boracic acid, and makers are unable to cope with same. Phosphate of soda is dearer in the absence of supplies. Lump salammoniac has been advanced further £5 per ton, but demand has slackened somewhat. Muriate of ammonia continues in good request for export. There has been a good inquiry for both bleaching powder and caustic soda. Soda crystals and ammonia alkali are also in steady demand. Tar products generally are without change, the markets being very firm. Pitch maintains its strong tone, and business has been done for next season at increased values. Creosote continues in good demand with prices well maintained. Crude carbolic acid is scarce, and all available quantities are readily taken up at good prices. There is little doing in crystal carbolic, but high prices are being paid for liquid. Solvent naphtha, if anything, is better, there being more inquiry. Naphthalenes are in good demand, with consequent increase in values. Benzols and toluols are steady and prices are well maintained. A moderate business is being done in sulphate of ammonia at new season's prices, which for shipment vary according to destination.

Paraldehyde

To the Editor of THE CHEMICAL AGE

SIR,—It occurs to us that many chemical firms would be interested to know that acetaldehyde will shortly be offered by us. Acetaldehyde, as you are aware, is not able to be transported owing to its volatility, but we are in a position to offer the partially polymerised material, being 90 per cent. paraldehyde and 10 per cent. acetaldehyde. The material can, of course, be easily depolymerised and the acetaldehyde regenerated.—Yours, &c.,

Carpenter's Road, Stratford. A. BOAKE, ROBERTS & CO., LTD.

Death of Mr. T. P. Morson

GENERAL regret will be felt in the chemical industry at the death, which took place on Tuesday, of Mr. Thomas Pierre Morson, chairman of the board of directors of the old-established firm of Thomas Morson & Son, Ltd., manufacturers of fine chemicals, the Summerfield Chemical Works, Ponders End. Mr. Morson, who was in his 67th year, had been in the trade since he was a boy, and his name had become a household word in chemical circles. He had an exceptionally wide knowledge of the branch of the trade in which his firm have for so long specialised, and was known for his sound business qualities. He had been a member of the Society of Chemical Industry since 1906. The funeral will take place to-day (Saturday) at St. Margaret's Church, nr. Ware, Herts.

Recent Wills

Mr. J. Kenyon, of Accrington, chemist and druggist	£10,100
Mr. W. G. Smith, of Kingston-on-Thames, for many years carrying on business as a candle and soap manufacturer at Kingston, Staines and Hampton	£32,509

SAPON SOAPS.—A new company is being formed in America with increased capital, and with works and offices in New York, and a Canadian subsidiary has been recently registered in Ontario. Negotiations are also pending for the formation of a company in Birmingham. In these subsidiary companies Sapon Soaps will receive about £125,000 in shares, for the right to use their patented process. An agreement has been signed with an important firm of soapmakers in France to exploit the company's patents in that country, the Sapon Company holding one-third interest in the capital of the intended French company. The directors have resolved to call up 1s. per share on the ordinary shares on which at present 2s. has been paid, making them 3s. paid, the call being payable on or before July 20. It is also proposed to call up the remaining 1s. per share by September 20, of which notice will in due course be sent to shareholders concerned.

The British Taxpayers' Burden

IN answer to a question asking the amount of taxation per head per annum of the people of this country in 1913 and the present year, and the corresponding figures for each of the chief belligerents in the late war, Mr. Austen Chamberlain furnishes the following reply, to which have been added the equivalents in British money:—

	Year ending	Taxation per head.	Converted into sterling. At par.	Converted into sterling. At current rate.
		£ s. d.	£ s. d.	£ s. d.
United Kingdom	31.3.1914	3 10 10	...	...
	31.3.1920	21 6 4	...	...
	31.3.1921‡	22 0 6	...	...
U.S.A.	30.6.1914	$6.79	1 8 0	1 14 0
	30.6.1919	$37.93	7 15 8	9 9 7
	30.6.1920‡	$49.41	10 3 0	12 7 0
France	31.12.1913	Fr. 103.4	4 2 0	2 4 0
	31.12.1919	Fr. 209.6	8 6 4	4 9 3
	31.12.1920‡	Fr. 450. *	17 16 10	9 11 6
Italy	30.6.1914	Lire 33.9	1 6 4	0 10 4
	30.6.1919	Lire 134.3	5 6 6	2 2 0
Germany	31.3.1914	Marks 31.3	1 10 8	0 4 4
	31.3.1921‡	Marks 444.2†	21 15 8	3 1 0

* Provisional figure. Having regard to the late period in the financial year at which the Budget will have passed, it may not be reached. For a full year the amount per head will be substantially higher if the increases proposed by the Senate are accepted by the Chamber.

† Includes 37·50 marks, being the equivalent of the annual saving of interest on debt due to the capital levy.

‡ Estimated.

The Dunlop Explosion Inquiry

THE adjourned inquest on the seven victims of the explosion on May 21 at the Dunlop Rubber Company's works, Aston, was held in Birmingham on Tuesday. After a hearing lasting 5¼ hours the jury returned a verdict of "accidental death," and added that in their opinion the accident was due first to an error of judgment on the part of two men named Hughes and Rosendale (the former of whom is dead) and second, a lack of supervision on the part of those in charge.

The Coroner, in explaining the case, said the explosion occurred on May 21, just after 3.30 a.m., in one large shop where rolls of canvas varying from 150 to 300 yards in length were dealt with. These rolls went through five stages of manufacture in this shop. First of all the canvas was put into a Walker dryer (No. 1), which dried it, then it went into some soak boshes, and was there heavily impregnated with a solution of naphtha and rubber. When it came out of the boshes it went into a Scott dryer, and the spirit of the naphtha was recovered from it. After that it was nearly dry and quite safe to handle, and then went to a Walker dryer (No. 2), which simply warmed the canvas and prepared it for the calendar rolls. The point to which he wanted to direct the attention of the jury was that when the canvas came out of the soak boshes it was dangerous, in a sense, because it was heavily charged with naphtha, being about 2 cwt. to 2½ cwt. heavier than it was before the naphtha and rubber were spread on it. It gave forth a powerful smell, which would effect anybody who breathed it, and also emitted an inflammable vapour. This accident arose from a wet roll in this heavily charged condition not going through the Scott dryer, but being passed on to the Walker dryer (No. 2), so that the naphtha remained in it and gave off these fumes.

Commenting on the verdict the Coroner said it was not for him to pass any judgment on it, but the arrangement at the works seemed to have been all right if it was properly carried out. He did not know that he would have put in the rider.

PROF. F. HABER, director of the Kaiser-Wilhelm Institute for Physical and Electro-chemistry, is to succeed the late Emil Fischer at Berlin University. Dr. Haber has intimated his acceptance of this professorship, subject to being allowed to retain his present position, and it is therefore proposed to elect a second ordinary professor of chemistry.

Books Received

A TEXT-BOOK OF ORGANIC CHEMISTRY. By E. De Barry Barnett. London: J. & A. Churchill. Pp. 380. 15s. net.

Company News

ANGELA NITRATE.—For the year 1919 a dividend of 10 per cent. has been declared.

ANACONDA COPPER.—A quarterly dividend has been declared of 1 per cent.

MEXICAN EAGLE OIL.—The directors have declared a second dividend of 6 per cent. on the preference and ordinary shares.

HENDERSON'S TRANSVAAL ESTATES.—A dividend has been declared of 6 per cent., less tax, in respect of the year to March 31, calculated on the amounts for the time being paid up or credited as paid up on the shares.

PARKE'S DRUG STORES.—An interim dividend has been declared on the ordinary shares for the half-year to March 31 at the rate of 10 per cent. per annum, less tax, payable on June 30.

TREDEGAR IRON AND COAL.—The directors recommend a final dividend for the year to March 31 last of 7½ per cent. actual. The dividend will be paid on both classes of shares, free of tax.

BRITISH SOUTH AFRICAN EXPLOSIVES.—A dividend has been declared for the year to December 31, 1919, at the rate of 10 per cent., subject to British income-tax at the rate of 4s. 7d. in the £ and 1s. in the £1 in respect of South African tax.

BRITISH GLASS INDUSTRIES.—At an extraordinary general meeting in London on Monday the resolution passed on June 10, altering the articles of association was confirmed. It was also resolved that £2,100,000 derived from premiums paid to the company on the subscription of part of the existing share capital should be capitalised.

AMALGAMATED GLASS BOTTLE WORKS, LTD.—At the statutory meeting in London last week Sir C. H. Rason (chairman), who presided, said that the sale of bottles from the combined works in the past years amounted to about £49,400 per annum, an average of about £4,100 per month. Their sales for the past three months amounted to about £13,000. They anticipate paying the 10 per cent. preference dividend in full—possibly more.

DISTILLERS' CO.—A final dividend has been declared on the ordinary shares of 12s. per share, free of income-tax, payable on August 2 which, with the interim dividend of 8s. per share paid on February 2 last, makes the dividend for the year ended May 15, 10 per cent. £255,000 has been set aside to various reserve funds, leaving £100,526 to be carried forward. It is proposed to ask the sanction of the shareholders to an increase in the capital of the company, in order to provide funds for financing the business at the greatly enhanced values now ruling.

SALAR DEL CARMEN NITRATE SYNDICATE.—Owing to the state of the nitrate industry in 1919, the directors closed the company's oficina from August last until March of this year. In the seven months January-July, 1919, the company's production of nitrate was 231,241 quintals, and the profit realised on this, and on the stock brought in from 1918, together with sundry credits for iodine sales, &c., amounted to £26,371, and £6,995 was brought in, making £33,366. The directors recommend a dividend at the rate of 5 per cent. per annum, less tax at 6s., also an interim dividend of 5 per cent., less tax, on account of profit for 1920. After providing for various reserves £8,479 remains to be carried forward.

UNITED OIL AND REFINERY CO.—This company was formed to purchase from the Kansas Oklahoma Oil and Refinery Co. the entire share capital of three concerns operating in the United States—namely, the Alluwe Oil Co., the Alluwe Pipe Line Co., and the Kansas Oil Refining Co. At the statutory meeting in London on Monday Mr. Lionel Holland said that the purchase—for a sum of £45,000 in cash and the allotment of 180,000 fully paid shares in this company—had been completed. The authorised capital of the company consists of 500,000 shares of £1 each. Of these £250,000 were offered for subscription and underwritten, providing the company with a working capital of approximately £175,000 after meeting the purchase price, underwriting commissions, brokerage, and expenses of issue.

BRITISH OIL AND CAKE MILLS.—Mr. J. W. Pearson (chairman and managing director) presided on Thursday, June 24, at the twenty-second general meeting at Winchester House, Old Broad-street, E.C. In moving the adoption of the report and accounts the chairman said that the past had been a very successful year. At the end of March, 1919, the Ministry of Food ceased all operations in the articles manufactured by their firm and relinquished control. In order to enable the position to be quickly cleared, the seed crushing and oil refining industries made arrangements to take over the whole of the Government stocks and commitments in oils and oil seeds—and by the autumn trading had very nearly got back into normal channels. The motion was carried unanimously, and the dividends, as recommended in the report, were agreed to.

EXPLOSIVES TRADES.—The report for the year ended December 31, states that the receipts brought to account in respect of the first year's operations comprise the dividends received from the constituent companies out of trading profits for the year 1918 (prior to the date when the company began operations), and the dividends payable by them for 1919. The balance at credit of profit and loss account amounts to £1,655,242. A dividend at the rate of 9 per cent. per annum, less tax, was paid on the ordinary shares in July last, and out of the balance available of £1,061,011, the directors propose to pay a further dividend on the ordinary shares at the rate of 10 per cent. per annum, less tax, for the year, and on the deferred shares at the rate of 5 per cent. per annum, less tax, for the year, and after writing off preliminary expenses, £127,775, a balance of £231,473 remains to be carried forward.

"SHELL" TRANSPORT AND TRADING.—The report for the year 1919 states that including £1,136,877 brought in from 1918, there is a credit to profit and loss of £5,899,601. Deducting management, interest, legal and other expenses £49,354, there remains £5,850,247. From this amount preference dividends (absorbing £100,000) and interim dividends (absorbing £1,285,764) have already been paid. The directors recommend a further and final dividend for the year of 5s. per share, payable on July 5, making 35 per cent. for the year, free of tax, leaving £1,242,622 to be carried forward, subject to excess profits duty. This company's profits depend on the dividends declared by the companies in which it is a shareholder, and it is on this basis that the accounts are presented. During the year under review there have been issued in New York 750,000 shares at a premium of £4,390,625, of which the directors have placed £4,000,000 to reserve account and the balance, £390,625, to securities depreciation account.

LOW TEMPERATURE CARBONISATION, LTD.—This company is this week issuing 250,000 £1 shares at par. The total share capital is £1,200,000 equally divided into seven per cent. participating preference shares and ordinary shares of £1 each, and 570,921 of the former and 226,910 of the latter have already been issued. There has also been issued £145,027 of six per cent. first mortage debenture stock out of an autho rised total of £150,000. The principal object of the company is the erection and operation of works for the carbonisation or conversion of raw coal by the special process of the company into motor spirit, fuel oil, smokeless fuel, sulphate of ammonia, and gas. Important contracts, it is stated, have been secured with the Yorkshire Electric Power Company, the Sheffield Corporation, and Steel, Peech and Tozer, Ltd., Sheffield, while negotiations have been completed and agreements are in course of preparation with one of the largest steel makers in Scotland, and an important group of manufacturers on the Clyde. A considerable portion of the machinery and plant required for carrying out the contract with the Yorkshire Electric Power Company has already been erected at Barnsley by a concern whose shares are owned by Low Temperature Carbonisation, Ltd. From this plant gas is supplied to the power company under the contract with that company, and is used for burning under the boilers of their electricity generating stations. Great saving is thereby effected in working costs through the avoidance of all waste of the products which would otherwise be carried away as smoke. It is estimated that 1,000,000 tons of coal per annum will be carbonised in connection with the above contracts, which involve the supply of approximately 7,000 million cubic feet of gas. In addition, the following products will be available for sale:—Motor spirit for motor cars and aeroplanes, about 3,000,000 gallons per annum; fuel oil, suitable for Navy, and ship's fuel, about 16,000,000 gallons per annum; smokeless fuel for domestic use, about 700,000 tons per annum; sulphate of ammonia for fertilisers and high explosives, about 9,000 tons per annum. The proceeds of this issue will be devoted to the completion of the Barnsley works to an extended capacity of 175,200 tons of coal per annum, and to the general development of the company's business.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Application for Discharge

NEWTON, GEORGE EDWARD ELLIS (described in the Receiving Order as George Edward Newton), 74, Great Tower Street, London, lately residing at 203, St. James's Road, Croydon, Surrey, wholesale chemist. July 23, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

Liquidator's Notice

EASTERN COUNTIES DRUG CO., LTD. (in liquidation).—An extraordinary general meeting of members will be held at 34, Castle Street, Thetford, Norfolk, on Tuesday, July 27, at 4 p.m. H. Hawes, liquidator.

Companies Winding Up Voluntarily

BURMAH SOLID PETROLEUM FUEL CO., LTD.—Liquidator, J. M. Hamilton, Britannic House, 23, Great Winchester Street, London, E.C.2.

NORTH BUNNEY CHINA CLAY CO., LTD.—Liquidator, Mr. G. P. Bunt.

SOUTHERN CALIFORNIAN OIL SYNDICATE, LTD. (in voluntary liquidation).—A general meeting of members will be held at 3, Gerrard Place, London, W.1, on Tuesday, August 3, at 3 p.m. M. H. Adams, liquidator.

MANBRE SACCHARINE CO., LTD. (in voluntary liquidation).—A general meeting will be held at the registered office, Winslow Road, Fulham Palace Road, Hammersmith, on Friday, July 30, at 2.30 p.m. H. P. Tongue, liquidator.

MULTI-COLOR DYERS, LTD. (in voluntary liquidation).—A meeting of creditors will be held at the Grand Hotel, Aytoun Street, Manchester, on Tuesday, July 6, at 2 p.m. T. M. Threlfall, liquidatof.

THE BELL GRAPHITE CO., LTD. (in voluntary liquidation).—Creditors' claims on or before September 25, to the liquidator, E. Tappenden, 4, Coleman Street, London, E.C.2.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

EVANS SONS, LESCHER & WEBB, LTD., LIVERPOOL.—Registered June 10, charge under Land Transfer Acts securing £15,333 and further advances to Metropolitan Life Assurance Society, 13, Moorgate Street, E.C.; charged on 48, 49, 50, 51, 52 and 53, Barthomolew Close, E.C. *£95,000. March 26, 1920.

TAMAR WOLFRAM SYNDICATE, LTD., LONDON, E.C.—Registered June 16, £10,000 debentures (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908); present issue £5,000; general charge. *£5,000. December 31, 1919.

Satisfaction

BRITISH SULPHIDES SMELTING CO., LTD., LONDON, S.W.—Satisfaction registered June 18, £3,000, registered October 22, 1909.

Bill of Sale

[*The undermentioned information is from the Official Registry. It includes Bills of Sale registered under the Act of 1882 and under the Act of 1878. Both kinds require re-registration every five years. Up to he date the information was obtained it was registered as given below; but payment may have been made in some of the cases, although no notice had been entered on the Register.*]

WOOD, COLIN, 106, Moorfield Place, Hill Top, Thornton, Bradford, dyer's manager. Filed June 25. £50.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

STEWART'S PHARMACY, 522, Barking Road, E. £12 18 5. May 17.

BECK, H., Phœnix Drug Stores, 168, Green Street, Victoria Park, E., chemist. £15 14 5. May 19.

New Companies Registered

The following have been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.:—

COLLOIDAL PATENTS, LTD., 62, London Wall, E.C.—Manufacturers of fuel. Nominal capital, £50,000 in 50,000 shares of £1 each. Directors to be appointed by subscribers. Remuneration of directors, £100 each; chairman, £150.

BY-PRODUCT RECOVERIES, LTD., 4, Wine Office Court, E.C. 4.—To recover oil and other products. Nominal capital, £50,000 in 50,000 shares of £1 each. Directors: H. F. Wareham, 6, Hurst Road, Winchmore Hill, N. 21; A. A. Combe, 42, Montague Gardens, Wallington; W. F. Pemberton, 5, Wine Office Court, E.C. Qualification of directors, 500 shares. Remuneration of directors, £500 each.

A. T. KREMARS MANUFACTURING CO., LTD. (Reg. June 25, 1920.)—Merchants of chemicals, dyes. Nominal capital, £2,000 in 200 preference shares and 200 ordinary shares of £5 each. Directors: A. T. Kremars, 97, Clarendon Road, S.W. (governing director). Qualification of directors, 25 ordinary shares governing director. Remuneration of directors, £600 governing director.

LIGMA CHEMICAL CO., LTD., Entwistle Road Mill, Rochdale.—Chemists and druggists. Nominal capital, £3,000 in 3,000 shares of £1 each. Directors: A. Taylor, 108, Molesworth Street, Rochdale; J. E. Lightfoot, Lime Mount, Accrington. Qualification of directors, 500 shares.

REGALIA PHOTOGRAPHICS, LTD., 16, Warwick Street, Regent Street, W.—Manufacturers of photographic materials. Nominal capital, £1,400 in 1,400 shares of £1 each. Directors: O. J. Oakshett, "Ibrox," Hillbrow Road, Esher; A. G. N. Ford, "Inderle," Lower Mitcham; H. Thomas, 155A, Croydon Road, Anerley, S.E.

SHEFFIELD GLASS WORKS, LTD.—Glass bottle manufacturers and merchants.—Nominal capital, £3,000 in 3,000 shares of £1 each. Directors: T. Carter, Shire House, Shire Green, Sheffield; G. C. Carter, 23, Durham Road, Sheffield. Qualification of directors, £10.

THOS. WEBB & SONS, LTD., 6, Austin Friars, E.C. 2.—Glass manufacturers, &c. Nominal capital, £100 in 100 shares of £1 each. Directors to be appointed by subscribers.

WESTERN GLASS BOTTLE CO., LTD., 44, Corn Street, Bristol.—Glass manufacturers. Nominal capital, £60,000 in 60,000 shares of £1 each. Minimum subscription, £7. Directors: W. Evans, Bronwydd, Porth, Glam.; D. O. Bowen, The Lindens, Morriston, near Swansea; E. C. Chivers, Westfield, Waungron Road, Llandaff; T. H. Vile, Kia-Ora, Dewsland Park Road, Newport; W. D. Armstrong, 10, Royal York Crescent, Clifton, Bristol. Qualification of directors, £500. Remuneration of directors, £150 each; chairman, £200.

YOUNG (J.) RYMER, LTD.—Chemists and druggists, &c. Nominal capital, £5,000 in 5,000 ordinary shares of £1 each. Directors: J. R. Young, Hill Cliffe, Warrington (Governing Director); C. H. Wells, 4, Palmysa Square, Warrington (Managing Director). Qualification of directors, £500.